This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

http://books.google.com

ical Society
849

ogle

JUL 2 9 1919
Inv. 3323

PREFACE

The aim of the publishers of this volume and of the author of the history has been to secure for the historical portion thereof full and accurate data respecting the history of the county from the time of its early settlement, and to condense it into a clear and interesting narrative. All topics and occurrences have been included that were essential to this object.

We take pleasure here in acknowledging our indebtedness to the late D. B. Beardsley and to Mr. Jacob A. Spaythe, whose carefully prepared histories of Hancock County, published respectively in 1881 and 1903, have been found valuable for reference and other purposes in the compilation of the present work.

The reviews of resolute and strenuous lives that make up the biographical part of the volume are admirably calculated to foster local ties, to inculcate patriotism, and to emphasize the rewards of industry dominated by intelligent purpose. They constitute a most appropriate medium for perpetuating personal annals, and will be of incalculable value to the descendants of those commemorated. These sketches are replete with stirring incidents and intense experiences, and are flavored with a strong human interest that will naturally prove to a large portion of the readers of the book its most attractive feature. In the aggregate of personal memoirs thus collated will be found a vivid epitome of the growth of Hancock County, which will fitly supplement the historical statement, for its development is identified with that of the men and women to whom it is attributable. Sketches unrevised by subscribers are marked by a small asterisk (*) placed after the name of the subscriber.

The publishers have endeavored to avoid slighting any part of the work, and to fittingly supplement the editor's labors by exercising care over the minutest details of publication, and to give to the volume the three-fold value of a readable narrative, a useful work of reference and a tasteful ornament to the library. We believe the result has justified the care thus exercised.

Special prominence has been given to the portraits of representative citizens which appear throughout the volume and we believe that they will prove not its least interesting feature. We have sought in this department to illustrate the different spheres of industrial and professional achievement as conspicuously as possible. To all who have kindly interested themselves in the successful preparation of this work, and who have voluntarily contributed most useful information and data, or rendered other assistance, we hereby tender our grateful acknowledgments.

THE PUBLISHERS.

CHICAGO, ILL., October, 1910.

CONTENTS

CHAPTER I

SETTLEMENT OF THE NORTHWEST TERRITORY AND ORGANIZATION OF THE STATE OF OHIO 19

Introductory—Derivation of Title and Early Explorations—Achievements of George Rogers Clark—State Cessions and Indian Treaties—Settlement—Indian Wars—St. Clair's Defeat—Wayne's Campaign and Battle of Fallen Timber—Organization of the Northwest Territory—Organization of the State of Ohio.

CHAPTER II

THE ABORIGINES 41

Prehistoric Races—Pre-glacial Man—The Mound Builders—The Red Race.

CHAPTER III

FIRST ORGANIZATION OF HANCOCK COUNTY 46

The County Organized—Findlay Township Organized—First Elections—First Officials—Erection of the Township.

CHAPTER IV

INDEPENDENT ORGANIZATION OF THE COUNTY 50

First White Settlers—Hull's March—Fort Findlay—Murder of the Thomases—A Pioneer's Letter—Observance of the Golden Rule Among the Pioneers—Mrs. Ebberly's Narrative—First Election Under Independent County Organization—Poll Book of Election and County Officers.

CHAPTER V

TOPOGRAPHICAL 59

Acreage of the County—Its Boundaries and Surface—The Soil—The River—Jean Jacques Blanchard—"Wild Cat Thicket"—Timber-Marshes—Sand Ridges—Crops—Springs—Benefit of the Limestone Formation—Under Drainage—Fish and Game.

CHAPTER VI

PIONEER DAYS 63

Early Records—Population—Settlements—Missionaries and Meeting Houses—Camp-Meetings—First Sermon—Early Schools and Schoolmasters—The Country Schoolmaker—Log Rolling—Shooting—Corn-husking—House-raisings—Threshing—Quilting Bees—Racing and Other Sports—Stores and Taverns—Necessaries of Pioneer Existence—Description of Old Time Tavern—General Muster—Malaria and Milk Sickness—Taxable Property in 1824—Tax Levies—Findlay Selected as the County Seat—The First Marriage—A Contested Election—County Printing—Road-Building—Administration of Estates—A Foul Murder—Simon Girty—Johnny Appleseeds—J. N. Free.

CHAPTER VII

TRANSPORTATION 87

First Roads and Bridges—Steam Railroads—Electric Roads.

CHAPTER VIII

THE COUNTY'S MILITARY RECORD 94

The War of 1812—The Mexican War—The Civil War—Spanish-American War.

CHAPTER IX

THE BENCH AND BAR 105

Early History—Famous Judges and Lawyers—Hancock County Bar Association—First Jail and Court-House.

CHAPTER X

THE PRESS 132

Early News Conditions—Presses in Use—The Old Time Compositor—Leading Newspapers of the County—Their Proprietors and Editors—Value of the Daily Press.

CHAPTER XI

THE MEDICAL PROFESSION 140

Hancock County Medical Men of the Past and of the Present.

CHAPTER XII

HANCOCK COUNTY SOCIETIES 150

The Fraternal Lodges—The Odd Fellows—Masons—Elks—Tribe of Ben Hur—Daughters of America—Grand Army of the Republic—The W. C. T. U.—The Hancock County Agricultural Society.

CHAPTER XIII

CHURCH HISTORY 163

The Pioneer Preacher—Hardships Endured—Small Salaries—Progress of the Various Denominations in Hancock County—Churches of Findlay and Hancock County.

CHAPTER XIV

ALLEN, AMANDA AND BLANCHARD TOWNSHIPS 174

CHAPTER XV

BIG LICK, CASS AND DELAWARE TOWNSHIPS 187

CHAPTER XVI

EAGLE, JACKSON AND LIBERTY TOWNSHIPS 197

CHAPTER XVII

MADISON, MARION AND ORANGE TOWNSHIPS 209

CHAPTER XVIII

PLEASANT, PORTAGE, UNION, VAN BUREN AND WASHINGTON TOWNSHIPS, AGRICULTURAL STATISTICS 219

CHAPTER XIX

TOWNS AND VILLAGES 239

Sketches of Arcadia, Arlington, Benton Ridge, Cannonsburg, Deweyville, Findlay (including Gas and Oil Industry and Findlay College), Fostoria, Houcktown, Jenera, McComb, Mt. Blanchard, Mt. Cory, Rawson, Shawtown, Van Buren, Vanlue, West Independence, Williamstown, Etc.

CHAPTER XX.

MANUFACTURING INDUSTRIES 271

The Hancock Brick and Tile Co.—Buckeye Traction Ditcher Co.—U. S. Electric Porcelain Co.—Findlay Clay Pot Co.—Boss Manufacturing Co. —D. Kirk Sons & Co.—Findlay Table Manufacturing Co.—Hollerback Piano Co.—The H. H. Fassett Planing Mill—Tarbox and McCall—Findlay Casket Co.—Hayward & Young—Findlay Carriage Co.

CHAPTER XXI

BANKS AND BANKING 276

Commercial Bank and Savings Co.—The American National Bank—The First National Bank—The City Banking Co.—The Buckeye National Bank.

CHAPTER XXII

RECAPITULATION AND STATISTICS....................................281

Comparison of Early and Present Conditions—Road Building—Sewerage—Timber—Land Values—Agricultural Prosperity—Public Buildings—Water Supply—Manufacturing Industries—Some First Things—Roster Public Officials.

REPRESENTATIVE MEN 297

INDEX

Adams, James T. 615
Adams, Mnason A. 538
Adelsperger, John 599
Adelsperger, William H. 599
Agin, A. M. 387
Alexander, Eli 634
Alge, Charles 585
Alge, Joseph 411
Anderson, Fred E., V. S. 533
Anderson, Isaiah J. 533
Appleseeds, Johnny 83
Archer, Frank 328
Arras, John 539
Arras, Nicholas 539
Auten, Elbert B. 433

Baker, Alexander 430
Baker, John 430
Baker, John W. 392
Baker, Dr. Joseph P. 356
Baldwin, Dr. William H. 141
Balsley, Dr. Alfred W. 464
Bame, John 554
Barnd, John D. 457
Barnhill, Dr. Tobias G. 144
Barr, James H. 616
Barr, James M. 616
Battles, Asa 579
Battles, Edward 631
Battles, William 578
Beach, Dr. J. W. H. 471
Beagle, Alva 546
Beagle, John S. 546
Beardsley, Daniel B. 119, 323
Beardsley, Dr. Herbert V. 323
Beck, C. E. 507
Benington, Ozias E. 573
Bensinger, Reuben 358
Bensinger, William 358
Betts, John E. 547
Bibler, David A. 432
Bibler, John 432
Bibler, Samuel M. 472
Bickelhaupt, Frederick J. 375
Bicknell, J. E. 549
Biggs, Dr. Don B. 507
Biggs, Rev. Peter 507
Biglow, Aaron H. 116
Blackford, Aaron 117
Bloom, William F. 569
Boger, Jacob H., D. D. S. 647
Bolton, Samuel H. 437
Bope, Col. James A. 327
Bope, Edward V. 328
Boutwell, Edward 532
Boutwell, Edwin 532
Bower, Adam 531
Bower, Jacob 531
Bowersox, Benjamin 421
Bowersox, Robert 423
Brenner, John 507
Brenner, Mathias 507
Brickman, Lewis F. 417
Bright, Hon. Charles 331
Bright, David 331
Brinkman, Henry 586
Brinkman, Henry C. 586
Brinkman, Henry W. 569
Brown, Ezra 114
Brown, Frank 360
Brown, Rev. Charles I. 304
Brown, Henry 116
Bunn, W. C. 498
Bunts, William C. 119
Burket, E. W. 473
Burnette, C. R. 509

Bushong, Isaac 563
Byal, John M. 622
Byall, Absolom P. 120

Canfield, Cyrus W. 376
Caples, John F. 118
Carlin, Dr. William D. 142
Carr, Charles W. 407
Carr, Cyrus H. 407
Carrothers, Dr. M. M. 442
Casterline, Cyrus L. 637
Champion, George K. 422
Champion, William J. 422
Child, Daniel E. 555
Clark, Charles 466
Clark, James R. 349
Clark, Wesley 466
Clayton, Joseph B. 319
Cloud, Robert W. 394
Coates, Everett H. 577
Coffin, M. L. 608
Coffinberry, Andrew 118
Coffinberry, Charles S. 116
Coffinberry, Hon. James M. 115
Cole, John W. 574
Cole, William W. 574
Conine, James H. 304
Conine, Lyman M. 304
Cookson, Franklin 421
Cooper, Allen 602
Cooper, Hon. Willis E. 602
Corthell, Clinton S. 612
Crawford, Jackson H. 531
Crawford, Lawrence J. 479
Crist, E. E. 482
Crist, John M. 482
Crites, Jacob T. 449
Crothers, Dr. M. M. 148
Cusac, James S. 417

Dailey, Baker 346
Dailey, Samuel C. 346
Darbyshire, Dr. Morris A. 307
David, Harry G. 395
Davis, Charles 592
Davis, Isaac 344
Davis, N. D. 337
Davis, William 344
Decker, James 418
Decker, Leonard B. 418
Deeds, Charles W. 450
Deeds, Henry 605
Deming, Richard B. 332
Dennis, Charles 633
De Rodes, Rev. Henry C. 447
Deter, Charles 607
Detwiler, Dr. William D. 143
Dick, David 396
Dick, George 396
Dicus, A. C. 638
Diebley, William 300
Diller, E. L. 443
Dorsey, Hon. Homer O. 367
Dorsey, Wallace 338
Dreisbach, D. M. 355
Dukes, Charles C. 301
Dukes, Jasper 601
Dukes, John 301
Duncan, William F. 646
Dunn, Elijah T. 122

Edwards, Luke 530
Elsea, Harley C. 303
Entrikin, Dr. Franklin W. 144
Ewing, Alvin C. 540
Ewing, Erwin E. 380
Ewing, Hiram C. 403
Ewing, Jacob 403
Ewing, Jacob 380

Falk, William H. 532
Ferguson, Jeremiah 575
Fetters, Irvin 340
Fetters, Peter 340
Findlay, Col. James 646
Firmin, Dr. Francis W. 353
Firmin, John C. 530
Firmin, Dr. Lorenzo 495
Fiscus, William J. 391
Folk Bros. 335
Folk, John C. 335
Folk, Samuel S. 335
Foreman, John F. 608
Foreman, Richard M. 544
Foreman, Rufus 608
Fox, Elias 406
Fox, Nicholas 456
Fox, William 456
Franks, Jasper 614
Franks, Samuel S. 614
Free, Jacob Newman 84
Frick, Daniel W. 610
Fry, Benjamin F. 424
Fry, Henry 424

Fuller, Andrew G. 655

Garber, Christian 302
Garber, Leroy E. 302
Geisey, Ulysses G. 489
George, Dr. Edward 526
Gibson, John W. 330
Glathart, Aaron J. 428
Glathart, Harry A. 456
Glessner, Leonard C. 343
Gohlke, Richard J. 423
Goit, Edson 111
Good, A. H. 468
Gorby, Levi 396
Green, Chester L. 548
Gressly, Jacob 459
Gressly, P. J. 459
Gribben, William 117
Groves, Hon. E. Lincoln 353
Guise, Dr. J. M. 147
Guise, Dr. P. O. 147

Hagerty, Hon. D. P. 502
Hamlin, John M. 611
Hammond, George F. 545
Hammond, Thomas 524
Hammond, William P. 524
Harry, Jasper F. 411
Hart, Abraham 473
Hart, Isaac 543
Hart, John 472
Hartman, Dr. John V. 580
Hay, Edwin R. 476
Hay, Peter 476
Hayward, Collin D. 467
Heimhofer, John B. 509
Heldman, John 451
Hennings, William J. 441
Hersh, Dr. Edward G. 529
Hickle, George J. 513
Higbie, Dr. J. L. 375
Hillshafer, Conrad 515
Hilty, Elmer 465
Hilty, John H. 629
Hirscher, Martin 459
Hirscher, William G. 459
Hofmaster, Alpheus 637
Hofmaster, Jonas 637
Hogrefe, Conrad H. 584
Hopper, Ernest W. 437
Hopper, William 437
Horn, George J. 475
Horn, John B. 475
Hosler, Peter 556
Hosler, William F. 556
Houck, William 587
Houck. W. E. 587
Houck, William H. 623
Huff, Judge Abraham 108
Huffman, Norman 526
Huffman, Oliver 606
Hughes, Dr. Don C. 427
Humphrey, Jarvis 495
Hurd, Dr. Anson 142
Hurin, Hon. Silas E. 320

Iler, Jackson 465
Iler, Lemuel C. 465
Inebit, Peter 368
Insley, Martin 458

Jackson Company, C. F. 415
Jackson, C. F. 415
Jackson, Edward E. 415
Jelly, John H. 506
Johns, James S. 359
Jones, Elijah P. 648
Jones, George P. 335
Jordan, Charles E. 643
Jordan, William 401

Kagey, William M. 432
Kagy, David B. 517
Kagy, Hon. Joseph R. 521
Karg, Albert E. 589
Karg Bros. 589
Karg, Charles A. 589
Karg, Fred J. 589
Karn, Ezra 613
Karn, Theodore 613
Karst, Frank 618
Keeran, George W. 413
Keeran, Dr. Rueben B. 523
Kelley, Charles A. 639
Kennedy, Mrs. Cornelius, M. D. 147
Kilgour, Charles 474
Kimmell, Dr. Jacob A. 501
Kinder, Hon. W. H. 297
Kinder, Hon. William R. 608
King, Dr. Cyrus F. 412
King, John 412
King, Robert L. 560
Kirkbride, James W. 564
Kirsten, Oscar 450

Kramer, N. J. 383
Krichbaum, William 329
Kobe, Carl 439
Kyser, Dr. Abraham M. 373
Kyser, Cornelius 373

Lang, Thomas W. 402
Lanning, J. N. 487
Lee, Dr. Richard N. 558
Leeper, William O. 339
Lehr, Dr. William F. 576
Lightfoot, Daniel F. 536
Lightfoot, Henry 536
Linaweaver, Dr. Albert H. 147
Line, Jacob 592
Line, James O. 643
Linger, Thomas C. 623
Long, James 405
Long, Hon. John M. K. 513
Long, John W. 405
Long, R. J. 405
Lowe, Hon. S. E. 488
Luden, Frederick 379
Lyon, Albert B. 440
Lyon, Henry L. 490
Lyon, Edward S. 311

McAnelly, Moses 605
McCall, James A. 418
McCaughey, William D. 544
McDowell, P. 522
McKelvy, Samuel L. 379
McKinnis, Judge Robert 107
McLeod, Dr. Joseph R. 651
McManness, Lemuel 309
McNeal, Arthur N. 398
McNeal, John P. 398
Mackey, Robert I. 645
Mackey, William 645
MacLachlan, Dr. Norman L. 317
Manecke, Henry 393
Manecke, William 393
Marquart, J. P. 433
Martin, Jerome M. 313
Martin, Dr. John C. F. 145
Marvin, Isaac W. 347
Marvin, Stephen 347
Mathewson, Peter A. 523
Mathewson, Dr. W. R. 523
Matter, Daniel 566
Merriam, Arnold F. 112
Metzler, Dr. Willis M. 650
Metzler, Jacob L. 584
Miller, Frank L. 404
Miller, Jones R. 404
Mitchell, George A. 395
Molder, Allen 320
Molder, Frank 320
Molder & Sons, H. 320
Montgomery, George 621
Montgomery, George C. 577
Montgomery, George W. 577
Montgomery, Jesse W. 386
Montgomery, John T. 535
Moore, Andrew J. 338
Moore, Hon. Charles I. 442
Moore, Ralph W. 652
Moorehead, John E. 431
Moorehead, Samuel Edgar 431
Moorhead, Andrew 581
Moorhead, Samuel Edwin 581
Moorhead, Thaddeus E. 581
Morehart, Harry J. 427
Morehart, Jesse D. 427
Morrison, John H. 113
Mosier, Cory E. 310
Mosier, John P. 630
Mowery, George W. 365
Mumma, E. Leslie E. 320
Mungen, Hon. William 118

Neeley, O. E. 582
Neff, M. D. 618
Neiswander, Joshua 596
Neuman, August 621
Niles, Charles E. 603
Nonnamaker, Rev. John J. 496
Norris, Alexander M. 499
Norris, D. L. 499
Norris, George W. 628
Nusser, John A. 652
Nusser, William C. 484

Oehlschlager, Joseph 521
Oesterlin, Dr. Charles 141
Oller, Clarence J. 537
O'Neal, Hon. Charles W. 113
Opp, A. L. 606
Opp, Benjamin F. 347
Opp, John 348

Palmer, Hon. John M. 122
Parker, Abel F. 114
Parker, Harry J. 343

Patterson, Charles W. 601
Patterson, Frank T. 601
Patterson, Joseph S. 600
Patterson, William M. 115
Pendleton, Hon. George F. 298
Pepple, David E. 640
Pletcher, Samuel S. 466
Poe, John 492
Poe, Merle N. 492
Powell, Bateman B. 302
Powell, Daniel 302
Powell, Dr. H. J. 655
Powell, Dr. Jacob E. 364
Powell, Dr. J. E. 147
Powell, Oliver 626
Priddy, Hon. S. N. E. 567
Pugh, Joseph 550

Rader, Henry B. 452
Rader, John 452
Rausch, Peter 549
Rawson, Dr. Bass 140
Redick, Adam 627
Redick, Benjamin 627
Reimund, John 348
Reimund, William 349
Renninger, Samuel E. 573
Renshler, John D. 553
Rettig, Adam 622
Reycraft, Dr. Albert J. 515
Rhinehammer, Daniel 318
Rhinehammer, Sylvester 318
Riddlebaugh, Henry 345
Riddlebaugh, John H. 345
Rieck, Charles 489
Robinson, Frank S. 443
Robinson, Jacob M. 570
Robinson, Samuel H. 570
Robinson, S. G. 497
Roller, Henry S. 574
Roller, Michael 574
Rose, Rev. Alvan 363
Rose, John S. 363
Rosenberg, Jacob 133
Rosette, John E. 116
Roth, Charles P. 358
Roth, George 358
Ruckman, Dr. J. M. 568
Ruhl, John S. 448
Rummell, William R. 559
Russell, Alfred L. 369
Rutledge, Abraham 640
Rutledge, H. J. 640

Sampson, Albert 337
Saunders, Dr. O. H. 525
Saunders, Thomas J. 525
Schaller, Christian 403
Schaller, Philip 403
Scothorn, A. W. 312
Scothorn, W. W. 312
Searfoss, Jacob 385
Searfoss, Levi 385
Shafer, M. C. 627
Shafer, Solomon 500
Shank, Albert 501
Shank, Frank C. 500
Sharninghouse, George F. 505
Sharninghouse, William 505
Shaw, Hon. O. P. 299
Sheldon, J. C. 378
Sheppard, Clark L. 370
Shoop, Daniel 460
Shoop, Joseph E. 481
Shuler, Charles H. 463
Shuler, Henry 463
Sink, J. J. 455
Slupe, Jacob 587
Smith, Augustus M. 483
Smith, Charles F. 369
Smith, Henry W. 632
Smith, John W. 510
Smith, McConnell B. 311
Smith, Peter J. 413
Smith, William F. 632
Snider, Samuel 309
Snider, Solomon 309
Snively, Samuel 407
Snyder, William E. 580
Solt, Herbert S. 534
Solt, Peter 534
Spitler, Douglas 590
Spitler, Eli 449
Stall, George W. 448
Stall, John F. 448
Steiner, J. L. 583
Steiner, P. D. 583
Steiner, Rev. T. R. 467
Stoker, Harrison W. 388
Stoker, Tunis 388
Stouffer, Joseph 439
Stouffer, Samuel 439
Stough, Christopher 525

Stough, George 518
Stough, George S. 536
Stough, Henry 518
Stover, Samuel S. 558
Swab, George 416
Swab, John W. 354
Swab, Samuel 416
Swab, Solomon 355
Swartz, Marion 565
Swinehart, Andrew 553
Swinehart, P. P. 553

Tarbox, Harry L. 609
Taylor, Charles 638
Taylor, Edmund C. 625
Taylor, Homer L. 638
Taylor, John W. 350
Taylor, Rufus E. 330
Taylor, Washington 350
Thomas, Dr. Earl J. 148
Thomas, Henry B. 597
Thomas, Jacob 597
Thomas, J. Curtis 378
Thomas, John D. 487
Thomas, Levi M. 378
Thompson, George R. 516
Thompson, L. F. 516
Todd, Benjamin 593
Todd, Dr. Calvin D. 391
Todd, Elisha 593
Todd, William H. 391
Totten, Hon. Theodore 340
Tritch, Dr. John C. 314
Tritch, Parlee C. 314
Trout, George F. 498
Trout, Len 499
Trovinger, Dr. J. R. 624
Twining, Robert P. 563

Urban, Ernest E. 479

Van Eman, George F. 534
Van Horn, Dr. Allison M. 147
Vanhorn, Charles E. 568
Van Horn, Dr. W. S. 482
Varnum, Dr. J. H. 459
Vickers, Dr. Hilton A. 565

Waaland, Jens J. 480
Waggoner, William G. 610
Walker, Hon. James B. 596
Walker, S. C. 516
Wanamaker, Eliphes 543
Warfel, Ephraim M. 471
Wells, Harvey H. 633
Wentz, Ross 329
Wertenberger, George H. 557
Wertenberger, John 557
Westfall, Dewitt C., D. O. 490
Wetherald, Ross J. 497
Wetherald, Sylvester R. 497
Wheland, Clyde 365
Whiteley, Hon. Machias C. 114
Williams, Elijah 114
Williamson, Dr. Milton S. 148
Williamson, W. A. 556
Williamson, W. M. 556
Wilson, Judge Ebenezer 108
Wilson, Dr. Huron S. 148
Wise, Oscar 578
Wisely, Martin L. 644
Wisely, William P. 644
Wittenmyer, W. H. 484
Wolf, Levi 491
Wolf, Mrs. Mary 491
Woods, James 386
Woods, Dr. L. S. 385
Worden, A. L. 590
Worden, A. C. 590
Worst, Joseph 560
Wortman, John 474
Wyer, Henry 363
Wyer, Henry 324
Wyer, J. N. 360
Wyer, William W. 324

Yates, Darius W. 650
Yost, Dr. William N. 384

Zeller, John W. 616
Zophi, Dr. J. W. 148

J. A. KIMMELL, M. D.

History of Hancock County

CHAPTER I.

SETTLEMENT OF THE NORTHWEST TERRITORY AND ORGANIZATION OF THE STATE OF OHIO.

Introductory—Derivation of Title and Early Explorations—Achievement of George Rogers Clark—State Cessions and Indian Treaties—Settlement—Indian Wars—St. Clair's Defeat—Wayne's Campaign and Battle of Fallen Timber—Organization of the Northwest Territory—Organization of the State of Ohio.

Hancock County constitutes a small portion of that vast domain known as the Northwest Territory, which embraced within its limits all of the present States of Ohio, Indiana, Illinois, Michigan and Wisconsin. Yet the history of the county cannot be properly written without some account of the more important events that concern the exploration, development and organization of the territory as a whole. Long before the first white man had set foot on the soil of what is now Hancock County, her destiny was being shaped by events of even greater importance than any that have transpired within her own borders; and long prior to her organization as a county, wars were being fought, treaties made, and laws enacted through which alone her very existence was made a possibility. While the present work contemplates particularly an account of those events which are peculiar to Hancock County as a separate civil subdivision of the State, and while the reader must be referred to the larger and more pretentious histories of the Northwest Territory and Ohio for fuller information regarding them as a whole, yet it is deemed necessary to a proper understanding of the history of the county to review some of the leading events that characterized the development of the entire domain, and to present, in outline, some of the chief circumstances that have contributed to the present condition of prosperity and power occupied by this widely extended area.

DERIVATION OF TITLE.

The claims first asserted to lands in the Western Hemisphere by European monarchs were based on discoveries made by their subjects. Accordingly we find all that vast region between the Allegheny and the Rocky Mountains, originally known by the general name of Louisiana, claimed by France, in consequence of the explorations, chiefly, of Father Marquette, a Jesuit missionary, and La Salle. In 1673 Marquette, accompanied by M. Joliet, starting from Mackinac, traced their way southward from there to the Wisconsin River, which they followed to its junction with the Mississippi. They then descended the Mississippi for a 1,000 miles, and, on their return to Canada, urged in the strongest terms the immediate occupation of this vast and fertile region watered by the Mississippi and its tributaries. There are other accounts of the discovery of the Mississippi, but the one ascribing it to Marquette seems to be the first that is authentic.

Between the years 1678 and 1682 La Salle with Father Hennepin, conducted a series of explorations around the great lakes and along the Mississippi, going as far south as Peoria Lake, Illinois. Here they erected a fort, after which La Salle returned to Canada. Father Hennepin explored the region now embraced within the limits of Ohio and is said to have published a volume containing an account of his discoveries "in the country between New Mexico and the frozen ocean," together with maps of Lake Erie, Huron and Michigan, and a plat of the larger streams of Ohio. In 1683 La Salle went to France and induced the French Government to fit out an expedition for the purpose of planting a colony at the mouth of the Mississippi. The expedition failed completely, however, La Salle being murdered by one of his own men.

The French still persisted in their efforts to gain possession of this vast region, west of the Alleghenies and the English colonies. Under the command of M. D'Iberville a second expedition sailed from France, entered the mouth of the Mississippi (March 2, 1699), and explored the river for several hundred miles. A chain of trading, missionary and military posts was ultimately established extending from New Orleans to Quebec by way of the Mississippi and Illinois Rivers, and thence, by way of Mackinaw and Detroit, to Lakes Erie and Ontario. This route was afterward shortened by following the Ohio River to the Wabash, and then following the latter upward and down the Maumee to Lake Erie. The French colonies, increasing steadily in numbers and strength, aroused the jealousy of the English, who, to check their advancement, formed what was known as the Ohio Company. This company made some attempts to establish trading houses among the Indians. The French, however, established a chain of fortifications back of the English settlements and thus secured to themselves the entire control of the Mississippi Valley.

Inasmuch as this same territory was claimed by the English Crown, it is necessary to consider the basis of the rights which she asserted. Her chief ground for claiming title to the territory west of the Alleghenies, was a treaty made with the Six Nations (otherwise known as the Iroquois) in the Ohio Valley. It was claimed that these nations had placed their lands under the protection of the British Crown. It was further asserted that in 1744 the British had purchased lands of these Six Nations by treaty at Lancaster, Pennsylvania. In 1748 the Ohio Company, organized by a number of Virginians and Londoners, obtained a charter from the British Government with a grant of 6,000 acres of land on the Ohio. The English, reverting to the times of the Cabots, claimed that by right they held the entire country from the Atlantic to the Pacific, bounded by the parallels of latitude defining their Atlantic Coast settlements. Inasmuch as France claimed the region drained by the Mississippi and its tributaries, together with the Great Lakes and their tributaries, Ohio was within the disputed territory. When the surveys for the lands of the Ohio Company were begun, the Governor of Canada entered a vigorous protest by establishing the line of forts to which we have before alluded. The dispute over this territory between the French and English was finally settled by the treaty following what is familiarly known in history as the French and Indian War. By the terms of that treaty, made in Paris in 1763, the British Crown came into undisputed possession of all the vast territory northwest of the Ohio.

The territory included within the present limits of Ohio, together with the entire domain northwest of the Ohio River of unknown extent, was originally claimed by Virginia. Her title rested upon three grants from the British Crown. The first charter was granted in 1606 by James I. to Sir Thomas Gates, Sir George Somers and others, authorizing them to establish two colonies, the first being known in history as the "London Company," and the second as the "Plymouth Company." The grant to the London Company covered a strip of sea coast fifty miles broad between the 34th and 41st parallels. In 1606 King James granted a second charter to the London Company. The territorial limits of the first charter were extended to embrace the whole sea-coast, north and south, within two hundred miles of Old Point Comfort, extending "from sea to sea, west and northwest." A third charter, granted in 1612, annexed to Virginia all the islands within three hundred leagues of the coast.

Virginia, however, was not undisputed in her assertion of title to the whole of this extensive region. Both Connecticut and Massachusetts claimed portions of the territory. In 1662 Charles II. granted to certain settlers upon the Connecticut all the territory between the parallels of latitude which include the present State of Connecticut, from the Atlantic to the Pacific oceans. The claims of Massachusetts were founded on a similar charter granted thirty years later. New York also had claims which she asserted.

A glance at the map will show the territories thus loosely defined in these different charters, overlapped each other, which subsequently gave rise to serious disputes between the States concerned.

ACHIEVEMENT OF GEORGE ROGERS CLARK.

By the treaty of peace, signed at Paris, September 3, 1783, the claims of the English monarch to the whole of the northwest territory were ceded to the United States. "The provisional articles which formed the basis of the treaty, more especially as related to boundary, were signed at Paris, November 30, 1872. During the pendency of the negotiation of these preliminary articles, Mr. Oswald, the British commissioner, proposed the River Ohio as the western boundary of the United States, and but for the indomitable perseverance of the Revolutionary patriot, John Adams, one of the American commissioners, who opposed the proposition, and insisted upon the Mississippi as the boundary, the probability is that the proposition of Mr. Oswald would have been acceded to by the United States Commissioners." That the British were prevented from making a reasonable claim to the territory northwest of the Ohio was due, in large measure, to the fact that this extensive domain was wrested from their hands during the Revolutionary war through the valor and foresight of General George Rogers Clark. On the outbreak of the Revolution he saw through the whole plan of the British who held all the outpost, Kaskaskia, Detroit, Vincennes and Niagara. It was the hope of the British that by means of these outposts they might encircle the Americans and also unite the Indians in a common war against them. Clark knew that many of the Indian tribes were divided in their feeling or but indifferent in their support of the British. He conceived the idea that if the British could be driven from their outpost, the Indians could be easily awed into submission or bribed into neutrality or friendship. Acting upon this theory, and first enlisting the support of Patrick Henry, then governor of Virginia, he organized an expedition which was entirely successful in wresting control of the country west of the Ohio from the British. To him, as well as to John Adams, is due unlimited credit for the fact that the Ohio River was not made the boundary between Canada and the United States.

STATE CESSIONS AND INDIAN TREATIES.

At the close of the Revolutionary war, the title to the British possessions having passed to the several colonies, each one, as a sovereign and independent state, claimed the right of soil and jurisdiction over the lands which had been originally granted it in its charter. As we have already observed, several states laid claim to portions of the vast, unappropriated tracts northwest of the Ohio. It was insisted by those States whose charters gave them no claims to any portion of this territory that inasmuch as the entire domain had been won from the British by the united efforts of all the colonies, the lands themselves should be appropriated for the benefit of all the states. It was repeatedly urged upon the states themselves which claimed ownership in these lands, that they should cede them for the common benefit of all. Responding to this demand the State of Virginia, on March 1, 1784, ceded to the United States her claims to ownership and jurisdiction over the entire part of the country embraced in her charter lying northwest of the Ohio. She made a condition, however, that in case the lands lying south of the Cumberland River were not sufficient to satisfy the bounties in land which she had issued to her soldiers during the Revolutionary War, then this deficiency was to be made up out of lands in this territory, lying between the rivers Miami and Scioto. The jurisdiction over all the land, however, passed to the United States. Likewise Connecticut, on September 13, 1786, relinquished to the United States all her claims to lands lying within this same territory, with the exception of the tract known as the Western Reserve. This she deeded to the United States May 30, 1800. The president, however, immediately conveyed the fee of the soil to the governor of the State for the use of grantees and purchasers coming under her, similar to the manner in which Virginia had also been allowed the fee of the soil in a certain portion to satisfy her military warrants. Massachusetts and New York also gave up their claims, thus giving to the United States a clear title to the whole of this vast region in so far as it had been claimed by European powers.

There still remained, however, the claims of the Indians to the lands as the original possessors of the soil. It was necessary that these should be disposed of before the white settlers could rightfully take possession. Accordingly a treaty was made with the Six Nations, embracing the Mohawks, Onondagas, Senecas, Cayugas, Oneidas and Tuscaroras, at Fort

Stanwix, October 27, 1784. By the terms of this treaty, all the lands west of a line drawn from the mouth of Oswego Creek, about four miles east of Virginia, to the mouth of Buffalo Creek and on to the northern boundary of Pennsylvania, thence west along that boundary to its western extremity, thence south to the Ohio River, were ceded to the United States. There were other Indian nations, however, besides those mentioned, who also asserted ownership over this territory. They included the Wyandot, Chippewa, Delaware and Ottawa Nations. With these also the United States made a treaty at Fort McIntosh on the 21st day of January, 1785. By this treaty the boundary line between the United States and the Wyandot and Delaware Nations was declared to begin "at the mouth of the river Cuyahoga and to extend up said river to the Portage, between that and the Tuscaroras branch of the Muskingum, thence down that branch to the crossing-place above Fort Laurens, then westerly to the Portage of the Big Miami, which runs into the Ohio, at the mouth of which branch the fort stood which was taken by the French in 1752; then along said Portage to the Great Miami, or Omee River, and down the south side of the same to its mouth; then along the south shore of Lake Erie to the mouth of the Cuyahoga River, where it began." "The United States allotted all the lands contained within said lines to the Wyandot and Delaware Nations, to live and hunt on, together with such of the Ottawa Nations as lived thereon, saving and reserving for the establishment of trading posts, six miles square at the mouth of the Miami or Omee River, and the same at the Portage, on that branch of the Big Miami which runs into the Ohio, and the same on the Lake of Sandusky where the fort formerly stood, and also two miles square on each side of the Lower Rapids of the Sandusky River." This treaty was afterwards renewed and confirmed by Governor St. Clair, and the Wyandot, Chippewa, Pottawatomie, and Sac Nations at Fort Harmar in 1789.

On the 3rd of August, 1795, a treaty was made with the Delawares, Ottawas, Pottawatomies and Eel River Indians by General Wayne after the close of his succesful campaign against them, terminating in the Battle of Fallen Timbers. The basis of this treaty was the previous one at Fort Harmar, the boundaries made at that time being reaffirmed, and the whites secured on the lands now occupied by them or granted by former treaties. This treaty marked the close of the Indian wars.

A treaty was made with the Indians at Fort Industry, on the present site of Toledo, in 1805, by which the United States acquired, for the use of the grantees of Connecticut, all that part of the Western Reserve which lies west of the Cuyahoga. The lands west of Huron and Richland Counties, and north of the Indian boundary line fixed by Wayne's treaty at Greenville, to the western limits of Ohio, were purchased by the United States in 1818 by a treaty made at St. Mary's. The lands ceded at this time were called the New Purchase. Certain reservations were made within the purchased tracts to the Delawares, Wyandots, Senecas, etc., which were subsequently ceded to the United States, the last by the Wyandots in 1842, they then being the only Indian tribe left within the State. Thus through a long series of explorations, wars, cessions and treaties has the title of the United States to lands of Ohio been derived. The organization of the Northwest into a territorial subdivision and the subsequent formation and admission to the Union, of the State of Ohio, has been reserved for later consideration.

SETTLEMENT.

The first English attempt at settlement of which we have any record, within the present limits of the State of Ohio, was at a point in Shelby County on Loramie Creek, about sixteen miles northwest of the present city of Sidney, and since known by the name of Loramie's Store. Here some English traders established themselves about the year 1749, and gave it the name of Pickawillany from the tribe of Indians there. The settlement however, was doomed to be of short duration. As we have heretofore seen, this location was clearly within the limits claimed by the French, and immediately aroused them to action. They could not endure so evident an invasion of their country, and gathering a force of the Ottawas, and Chippewas, their allies, they attacked the fort in June, 1752, having first demanded its surrender of the Miamis, who had granted the English the privilege of its erection. In the battle that ensued, fourteen of the Miamis were slain and all of the traders captured. They were either burned or taken to Canada as prisoners.

Most historians have regarded the settlement at Marietta, on April 7, 1788, as the first permanent white settlement in Ohio, but a closer investigation would seem to confer that honor upon Steubenville in Jefferson County, which was previously the site of Fort Steuben. This fort was visited by Major Ekuries Beatty in February, 1787, it being then guarded by Captain Hamtramck's and Mercer's companies. Although the garrison was removed in 1787, the fort continued to be a refuge for settlers until 1790, when it was accidentally destroyed by fire. Quite an account of life within its palisades was given by John Matthews, a nephew of General Putnam, who was one of the surveyors. According to Mr. Matthews' journal, this fort was not merely a small military garrison, but a busy center of frontier life, where people were coming and going, and where the foundations of a permanent and prosperous community were being laid. All this was in the year preceding the settlement of Marietta and that settlement was made possible by the work done here. It is very likely that the Marietta Argonauts landed at Steubenville on the way down, where the fort and settlement had already stood for a year and a half, and where there were already more people than in the visiting party. However this may be, a brief sketch of the Marietta settlement will be of interest as being an important part of the early history of the State, and the following facts, therefore, are worthy of attention.

We have already traced the various steps by which the title to the lands became vested in the United States, and through which alone the settlers could be secure in their possession. The final cession by the various states claiming rights in the northwest territory, to the Central Government, was the occasion for the formation of various land companies in the East, having for their purpose the settlement of this western country. The Ohio Company, before mentioned, emerged from the past and again became active. In the year 1786 Benjamin Tupper, a Revolutionary soldier, and General Rufus Putnam, circulated a pamphlet proposing the formation of a company for the purpose of settling the Ohio lands. It invited all those interested to meet in February in their respective counties and choose delegates to a convention to be held at the "Bunch of Grapes" Tavern in Boston on March 1, 1786. The purpose was to be the formation of a company and the adoption of definite plans for establishing a settlement in the Ohio Valley. On the day appointed eleven persons appeared, an outline was drawn up, and subscriptions began at once. The principal features of the plan were as follows: "A fund of $1,000,000, mainly in continental certificates, was to be raised for the purpose of purchasing lands in the western country; there were to be 1,000 shares of $1,000 each, and upon each share $10 in specie were to be paid for contingent expenses. One year's interest was to be appropriated for the charges of making a settlement and assisting those unable to move without aid. The owners of every twenty shares were to choose an agent to represent them and attend to their interests, and the agents were to choose the directors. The plan was approved, and in a years' time from that date the company was organized."

On the 8th of March, 1787, a meeting of the agents chose General Parsons, General Rufus Putnam and Rev. Manassah Cutler, directors for the Company. The selection of Manassah Cutler was extremely fortunate for the success of the enterprise, as few men could have been better fitted, both in character and ability, to conceive and execute a project of such importance as this would prove to be. A contract was made with the Treasury Board by Cutler and Winthrop Sargent, as agents for the Board of Directors of the Ohio Company, on October 27, 1787, by which there was conveyed to the company a vast region bounded on the south by the Ohio River, west by the Scioto, east by the seventh range of townships then surveying, and north by a due west line drawn from the north boundary of the tenth township from the Ohio direct to the Scioto, for the consideration of $1 per acre. Later, in 1792, the boundaries of the purchase were fixed as follows: The Ohio on the south, the seventh range of townships on the east, the sixteenth range on the west, and a line on the north so drawn as to make the grant 750,000 acres, besides reservations, this grant being the portion which it was originally agreed the company might enter into at once. In addition 214,285 acres were granted as army bounties, and 100,000 acres as bounties to actual settlers. While these preliminary arrangements for the occupation of the new territory were being carried out, Congress was likewise providing a plan for its government. The famous instrument known as the Ordinance of 1787, under which the first organization of the territory was effected, was passed on July 13th of that year, but of it we shall speak more in detail later on.

In the winter of 1787 General Rufus Putnam and forty-seven pioneers proceeded as far as the mouth of the Youghiogheny River, and, having built a boat for transportation down the Ohio, proceeded in the spring to the mouth of the Muskingum, where they landed on the 7th of April, 1788. Fort Harmar had previously been built at the mouth of the Muskingum, and it was on the opposite side of this river that the pioneers established their settlement which they later called Marietta, in honor of Marie Antoinette. With regard to this settlement of Ohio, George Washington wrote: "No colony in America was ever settled under such favorable auspices as that which has commenced at the Muskingum. Information, property, and strength will be its characteristics. I know many of the settlers personally and there never were men better calculated to promote the welfare of such a community."

Soon after their arrival the settlers began the erection of a stockade fort, which occupied their time until the winter of 1791. During the early years of the settlement, however, the Indians were friendly, no hostilities being experienced. One of the pioneers describes the progress of the colony during its first year as being all that could be expected, arrivals coming faster than provision could be made for them. By the close of the year 1790 eight settlements had been made within the Ohio Company's purchase, two at Belpre, one at Newbury, one at Wolf Creek, one at Duck Creek, one at the mouth of Meigs' Creek, one at Anderson's Bottom, and one at Big Bottom.

Not long after the grant of lands was made to the Ohio Company, John Cleves Symmes, of New Jersey, contracted with the Treasury Board for the purchase of a large tract of land lying between the Great and Little Miami Rivers. The terms of this purchase were similar to those of the Ohio Company. In July, 1788, he got together thirty people and eight four-horse wagons who started for the West. After meeting with Mr. Stites and a company from Redstone, Pa., they proceeded, under his leadership, to the mouth of the Little Miami, where they arrived before the 1st of January, 1789, and located on a tract of 10,000 acres which Stites had purchased from Symmes. This settlement, which they named Columbia and which was located about five miles above the site of Cincinanti, was the second settlement within Ohio territory.

In 1788 Mathias Denman purchased of Symmes a tract of land opposite the Licking River, and, in company with Robert Patterson and John Filson, to each of whom he sold a third interest in his purchase, projected the location of a town on the present site of Cincinnati. There is some uncertainty as to the exact time when a settlement was first made here, but it seems to have been late in 1788 or early in 1789. Symmes himself had contemplated building his main town at North Bend, near the mouth of the Great Miami. The fact, however, that this point, as well as Columbia, suffered severely during a great flood which occurred in 1789, while Losantiville, as Cincinnati was then called, escaped, had much to do with the fact that the latter soon outstripped the others in its growth. Ensign Luce, who had been commissioned by General Harmar to establish a fort, decided that North Bend was not a suitable location for that purpose, and, contrary to the wishes of Symmes, selected Losantiville. Fort Washington was thus established here. About the 1st of January, Governor St. Clair organized the county of Hamilton and constituted Cincinnati its seat of justice. The settlement at once began an active growth, outstripping that of all the others in the Ohio Valley.

At the time Dr. Cutler secured the grant of lands for the Ohio Company, he likewise secured a large additional tract, as he himself writes, "for private speculation, in which many of the prominent characters in America are concerned; without connecting this speculation, similar terms and advantages could not have been obtained for the Ohio Company." A company was at once formed known by the name of The Scioto Land Company, which contracted with Cutler and Sargent on behalf of the Ohio Company for a tract of land west and north of the Ohio Company's purchase.

Joel Barlow was sent to Europe, as the agent of the company, to make sales of the lands thus contracted for. He sold parts of the land to companies and individuals in France. It developed, however, that the lands which Barlow had presumed to sell were included within the Ohio Company's purchase, and that the purchasers were without title. In ignorance of this fact, however, two hundred and eighteen of these purchasers sailed from Havre de Grace, in France, on the 19th day of February, 1791, and arrived in Alexandria, D. C., on the 3rd of May following. On their arrival they proceeded to Marietta, where fifty of them landed, the remainder going to the present site of Gallipolis, which the agent of the company assured them was within their purchase. Prior to their arrival General Putnam had had the site cleared and buildings erected for their reception. As before stated, however, the lands to which alone they could lay any claim, were still farther to the West. Moreover, the Scioto Land Company, by having failed to make good the payments on its contract, forfeited its title to the land which it had purchased, thus leaving the settlers themselves without any vestige of title. These settlers, unlike the hardy pioneers who came from New England, were little accustomed to toil or to the privations of frontier life. Their condition was pitiable in the extreme and many gave up in despair, some seeking homes in the East and a few returning to France. Every effort to secure titles to the lands on which they had settled having failed, they petitioned Congress for assistance and in June, 1787, a grant was made them of land on the Ohio above the mouth of the Scioto River. The tract included 24,000 acres and is known as the French Grant.

During the progress of the various campaigns against the Indians, conducted successively by General Harmar, General St. Clair, and General Wayne, the settlement of Ohio was interrupted to a large extent. Prior to the treaty made with the Indians by General Wayne in 1795, however, a start had been made in several counties, in addition to those in Washington and Hamilton counties already mentioned. The settlement at Gallipolis has already been described. There were also small settlements in Adams, Belmont and Morgan Counties. They were block-house settlements and were in a continual state of defense. The first was settled in the winter of 1790-91 by General Nathaniel Massie, near where the town of Manchester now is. This was the first settlement within the bounds of the Virginia Military District and the fourth in the State. In spite of the dangers due to the hostility of the Indians, it continued to grow and, in two years after peace was declared, Adams County was constituted by order of Governor St. Clair.

During the Indian war a settlement was commenced near the present town of Bridgeport in Belmont County, by Captain Joseph Belmont, a noted officer of the Revolutionary War. Shortly afterwards a fort, called Dillie's Fort, was built on the Ohio, opposite the mouth of Grave Creek. In 1794 a company of men located on the present site of Hamilton in Butler County. The town was first laid out under the name of Fairfield. These were about all the settlements begun prior to the close of the Indian War and they were, for the most part, of a temporary character and maintained only at constant risk and great loss of life. With the termination of the war, however, and the cessation of Indian hostility emigration took a new impetus, and from that time the growth of the State's population was constant and vigorous.

Early in the spring of 1796 the first settlement was begun in Montgomery County. The town of Dayton was laid out in November of 1795. It was within the tract originally covered by Symmes' purchase. Judge Symmes, having been unable to pay for his purchase, the land reverted to the government and the settlers found themselves without title. Congress, however, came to their aid, permitting them to enter their lands at the regular government price.

It was likewise in 1796 that the first settlements were made in the Western Reserve. The mouth of the Cuyahoga River had always been considered an important place in the West and destined to become a great commercial mart. A corps of surveyors laid out the town of Cleveland in September, 1796. It was named in honor of General Moses Cleaveland, the agent of the land company which had made large purchases in the Western Reserve along the Cuyahoga River. Mahoning County was settled about the same time, as were also the counties of Ashtabula, Rose, Licking, Madison, Trumbull, and Warren. In a sketch of such a limited character as this we cannot pursue the history of the individual settlements further. It was not long until the settlers had penetrated to every portion of the State, clearing the land, starting industries of various kinds, and preparing the way for the marvelous prosperity which has ever since characterized the history of the Commonwealth.

INDIAN WARS.

Ohio has had its full share of conflict with the various tribes of Indians which were the original possessors of its soil. Being the first State in the vast region northwest of the Ohio River within whose limits settlement by the English was begun, it naturally became the scene of the early struggles through which the savage tribes were subdued and the land made possible of habitation for the white man. While we have given, in tracing the derivation of the title to the lands, the various Indian treaties which formed a link in that title, we have reserved for statement, here, a brief account of the wars which led up to the making of these treaties, or their enforcement. With regard to the wars which took place prior to the organization of the government of the territory, we quote the concise account given in Howe's History:

"After Braddock's defeat in 1755 the Indians pushed their excursions as far east as the Blue Ridge. In order to repel them, Major Lewis, in January, 1756, was sent with a party of troops on an expedition against the Indian towns on the Ohio. The point apparently aimed at was the upper Shawanese town, situated on the Ohio, three miles above the mouth of the great Kanawha. The attempt proved a failure, in consequence, it is said, of the swollen state of the streams and the treachery of the guides. In 1764, General Bradstreet, having dispersed the Indian forces besieging Detroit, passed into the Wyandot country by way of Sandusky Bay. He ascended the bay and river as far as it was navigable for boats, and there made a camp. A treaty of peace was signed by the chiefs and head men. The Shawnees of the Scioto River and the Delawares of the Muskingum, however, still continued hostile. Colonel Bouquet, in 1764, with a body of troops, marched from Fort Pitt into the heart of the Ohio country on the Muskingum River. This expedition was conducted with

GEN. GEORGE ROGERS CLARK

GEN. ANTHONY WAYNE

GEN.
WILLIAM HENRY HARRISON

GEN. ARTHUR ST. CLAIR

GEN. JOSIAH HARMAR

great prudence and skill and with scarcely any loss of life. A treaty of peace was effected with the Indians, who restored the prisoners they had captured from the white settlements. The next war with the Indians was in 1774, generally known as Lord Dunmore's. In the summer of that year an expedition under Colonel McDonald was assembled at Wheeling, marched into the Muskingum country, and destroyed the Indian town of Wapatomica, a few miles above the site of Zanesville. In the fall the Indians were defeated after a hard-fought battle at Point Pleasant, on the Virginia side of the Ohio. Shortly after this event Lord Dunmore made peace with the Indians at Camp Charlotte, in what is now Pickaway County.

"During the Revolutionary War most of the western Indians were more or less united against the Americans. In the fall of 1778 an expedition against Detroit was projected. As a preliminary step it was resolved that the forces in the West, under General McIntosh, should move up and attack the Sandusky Indians. Preliminary to this, Fort Laurens, so called in honor of the President of Congress, was built upon the Tuscarawas, a short distance below the site of Bolivar, Tuscarawas County. The expedition to Detroit was abandoned, and the garrison of Fort Laurens, after suffering much from the Indians and from famine, was recalled in August, 1779. A month or two previous to the evacuation of this fort Colonel Bowman headed an expedition against the Shawnees. Their village, Chillicothe, three miles north of the site of Xenia, on the Little Miami, was burned. The warriors showed an undaunted front and the whites were forced to retreat. In the summer of 1780 an expedition directed against the Indian towns in the forks of the Muskingum, moved from Wheeling under General Broadhead. This expedition, known as the 'Coshocton campaign,' was unimportant in its results. In the same summer General Clark led a body of Kentuckians against the Shawnees. Chillicothe, on the Little Miami, was burnt on their approach, but at Piqua, their town on the Mad River, six miles below the site of Springfield, they gave battle to the whites and were defeated. In September, 1782, this officer led a second expedition against the Shawnees. Their towns, Upper and Lower Piqua, on the Miami, within what is now Miami County, were destroyed, together with the store of a trader.

"There were other expeditions into the Indian country, which although of a later date, we mention in this connection. In 1786 Colonel Logan conducted a successful expedition against the Mackachack towns, on the head waters of Mad River, in what is now Logan County. Edwards, in 1787, led an expedition to the head waters of the Big Miami, and, in 1788, Todd led one into the Scioto Valley. There were also minor expeditions at various times into the present limits of Ohio.

"The Moravian missionaries, prior to the war of the Revolution, had a number of missionary stations within the limits of Ohio. The missionaries, Heckewelder and Post, were on the Muskingum as early as 1762. In March, 1782, a party of Americans, under Colonel Williamson, murdered, in cold blood, ninety-four of the defenceless Moravian Indians, within the present limits of Tuscarawas County. In the June following, Colonel Crawford, at the head of about 500 men, was defeated by the Indians three miles north of the site of Upper Sandusky, in Wyandot County.

He was taken prisoner and burnt at the stake with horrible tortures."

Although by the various treaties which we have heretofore mentioned, the English had secured title to the lands northwest of the Ohio, the Indians did not take kindly to the coming of the white settlers, and it was not long after their arrival that they began to show themselves hostile. That they were instigated, in some measure, by the British, cannot be doubted. Much could be traced to the malicious influence of the British superintendent of Indian affairs, Colonel McKee, his assistant, Captain Elliott, and the notorious white renegade, Simon Girty. A treaty confirming the former one made at Fort McIntosh, was made with the Indians at Fort Harmar in the year 1789. It had little effect, however, in staying Indian hostilities. In 1790 a company of 36 men went from Marietta to a place on the Muskingum known as Big Bottom. In view of the apparent unfriendliness of the Indians, the postponement of the settlement was advised by General Putnam and others. Moreover proper precautions were not taken against possible attacks. In an unguarded moment these settlers were set upon by the Indians and twelve of them killed. The settlers throughout the new territory immediately became alarmed and block-houses were erected for their protection. In 1789 Fort Washington was built within the present limits of Cincinnati, and a few months later General Harmar arrived with 300 men and assumed command. It was determined by Governor St. Clair and General Harmar to send an expedition against the Maumee towns and secure that part of the country. While St. Clair was forming his army and arranging for this campaign three expeditions were sent out against the Miami towns. One against the Miami villages, not far from Wabash, was led by General Harmar. With about fourteen hundred men, of whom less than one-fourth were regulars, he marched from Cincinnati in September, 1790. When near the Indian villages an advanced detachment fell into ambush and was defeated with severe loss. General Harmar, however, succeeded in burning the Indian villages and destroying their standing corn, after which he commenced the return to Cincinnati. Having received intelligence, however, that the Indians were returning to their ruined towns, he detached about a third of his remaining force, with orders to bring the Indians to an engagement. In the engagement which followed, more than one hundred of the militia were killed and all but nine of the regulars, the remainder being driven back to the main force. The expedition served little purpose other than to make the Indians, if anything, bolder than before. An army under Charles Scott was sent against the Wabash Indians. Nothing was accomplished save the destruction of towns and standing corn. In July another army under Colonel Wilkinson, was sent against the Eel River Indians. It became entangled in extensive morasses on the river and accomplished no more than the other expeditions which had preceded it.

ST. CLAIR'S DEFEAT.

Encouraged by the meager success of the whites in these expeditions, the chiefs of the Miamis, Shawnees and the Delawares now began the formation of a confederacy among all the tribes of the northwest territory, which, they conceived, would be strong enough to expel the whites beyond the Ohio. While they were making ready, however, Governor

St. Clair was engaged in the organization of a new army. He gathered together a force consisting of 2,300 regulars and 600 militia. It was his purpose to establish a chain of forts from the Ohio, by way of the Miami and Maumee Valleys, to the lakes. The plan was favored by Washington and General Knox, then secretary of war. It was said that a spirit of idleness, drunkenness and insubordination characterized the army at this time and had much to do with the defeat which followed later. On September 17, the army began its march and moved to a point on the Great Miami, where Fort Hamilton was established, the first in the chain mentioned above. The army then proceeded forty-four miles further on and erected Fort Jefferson, about six miles south of the present town of Greenville, in Darke County. On the 24th of October it again began its march through the wilderness, marshy and boggy and infested with savage foes. By the 3rd of November a stream was reached which St. Clair supposed to be a branch of the St. Mary of the Maumee, but which in reality was a tributary of the Wabash. The point was on what is now the line between Darke and Mercer Counties. The army had been so far depleted by desertion at this time that only about 1,400 men were left. St. Clair sent the first regiment, under Major Hamtramck, to pursue the deserters and secure the advancing convoys of provisions which it was feared the deserters intended to plunder. When they halted on the banks of the stream before mentioned, it encamped in two lines and threw up some slight fortifications against the Indians who were known to be in the neighborhood. On the next morning, about half an hour before sunrise, it was attacked furiously by the Indians. The evil effects of the insubordination before mentioned and the lack of sufficient drill were now made manifest. The army was thrown into hopeless confusion. It is probable that the whole disposable force of the tribes in the Northwest participated in the attack on St. Clair's army at this time. After losing about 800 men it began its retreat, which was a disgraceful, precipitate flight. After reaching Fort Jefferson it proceeded, by way of Fort Hamilton, back to Fort Washington.

This defeat was one of the worst ever suffered by an American army at the hands of the savage tribes, outrivaling even Braddock's defeat in this regard. It left the entire frontier exposed to the onslaughts of the savages, who were determined now, more than ever before, to exterminate the whites entirely. Execrations were heaped upon St. Clair who led the army to its terrible defeat. Under a more forceful commander, perhaps the result might have been different, yet the defeat was due, not alone to the inefficiency of St. Clair, but to the general demoralization of the soldiers whose insubordination we have before mentioned.

Plans were immediately formed for another campaign against the Indians. General Wayne, whose bravery and ability, as well as his experience during the Revolution, rendered him peculiarly well fitted for the task, was called to take command of the army which was raised. He immediately began the work of drill and organization.

Meanwhile efforts were being made by the United States to conciliate the Indians and avoid the necessity of warfare. The Iroquois were induced to visit Philadelphia, and were partially secured from the confederacy which we have before mentioned. Five independent embassies were sent among the western tribes in an effort to win them over and prevent war. All the embassadors were slain, however, except Putnam, who succeeded in reaching the Wabash Indians and effecting a treaty which was later rejected by Congress on account of its terms. A great council of the Indians, in which were represented all the tribes of the Northwest, and many others, assembled at Auglaize during the autumn of 1792, and prepared an address to the President wherein they agreed to abstain from hostilities until they could meet with the whites at the rapids of the Maumee in the following spring for a conference. The President appointed commissioners who, in accordance with the arrangement, met the representatives of the tribes at the appointed place. The Indians, however, would consent to nothing save the Ohio River as the boundary of their lands. This being out of the question for the whites, the negotiations came to an end.

WAYNE'S CAMPAIGN AND BATTLE OF FALLEN TIMBER.

Nothing was now left save war. General Wayne, on being informed of the termination of the efforts at securing a treaty, immediately began active preparations for a campaign against the Indians. Pending the negotiations with the Indians he had been sending out scouts and spies on errands of discovery and he had his plans by this time practically matured. All his information showed plainly that the Indians were receiving constant aid and encouragement from the British. He had spent the winter of 1793-94 at a fort which he had built on a tributary of the Great Miami, and which he called Greenville. The present town of Greenville is near the site of the fort. On the 26th of July, 1794, General Scott, with 1,600 mounted men from Kentucky, joined General Wayne at Greenville, and two days later the entire army moved forward, reaching the junction of the Auglaize and Maumee on the 8th of August, where they erected Fort Defiance. As Wayne's army moved northward the Indians abandoned their towns and collected their entire force, amounting to about two thousand men, near a British fort, erected in violation of the treaty of 1783, at the rapids of the Maumee. Before attacking the Indians, however, Wayne made still another attempt to conciliate them. He sent Christopher Miller, who had been naturalized among the Shawnees, and taken prisoner by Wayne's spies, as a messenger of peace. Miller returned with the message that if the Americans would delay for ten days the Indians would, within that time, decide the question of war or peace. Knowing the Indian character, however, Wayne determined to move forward. On the 18th of August, having marched forty-one miles from Auglaize, and being now near to the enemy, a fortification was erected which they called Fort Deposit. They remained here until the 20th, when they again took up their march. After having proceeded about five miles the foe was encountered. In striking contrast with the condition of St. Clair's army at the time it had suffered its crushing defeat, the army was now well disciplined and fully able to cope with the enemy. The conflict which ensued was one of the fiercest in the history of Indian warfare. The Indians were completely routed and many of them were slain, while the American loss was comparatively slight. This celebrated engagement is what is familiarly known as the battle of Fallen Timber. It was fought almost under the walls of the British fort. When the commander of that fort demanded an explanation of Wayne as to why he had fought so near and in evident hostility to the British, Wayne replied, not only by telling him he had no rights in the country, but by also marching forward and devastating the Indian country.

While the Indians were not immediately subdued by the crushing defeat received from Wayne, yet it went a long way towards breaking the strength of their hostility. Recognizing, at length, that opposition to the encroachments of the whites was useless, and that their ultimate subjugation was only a matter of time, they were willing to sue for peace. They arranged to meet General Wayne in June, 1795, at Greenville and form a treaty. This plan was carried out and the Greenville treaty, which marked the close of the Indian wars in the West, was the result.

ORGANIZATION OF THE NORTHWEST TERRITORY.

After the title to the lands northwest of the Ohio had become vested in the United States, and active preparations for their settlement began to be made, it became necessary for Congress to provide some form of government for the territory. The matter was one calling for the exercise of the highest statesmanship, and various plans were under discussion before a final settlement was reached. At one time Congress, under the influence of the Southern States, voted down Jefferson's proposition excluding slavery forever from the territory. It was likewise proposed to divide the territory into ten states to be known as Sylvania, Michigania, Cheresonisius, Assenispia, Metropotamia, Illinoia, Saratoga, Washington, Polypotamia and Pelisipia, the ultimate arrangement being, however, that there should be no less than three nor more than five states. The instrument which was finally adopted for the government of the Northwest Territory, and ever since popularly known as the "Ordinance of 1787," was, in large measure, the result of the efforts of Rev. Manassah Cutler, before mentioned as being instrumental in securing the grant of lands to the Ohio Company. It was passed on the 13th of July, 1787. Its cardinal principles were: 1st.—The exclusion of slavery from the territory forever; 2nd.—Provision for public schools, giving one township for a seminary and every sixteenth section (this gave one thirty-sixth of all the land for public education); 3rd.—Freedom in religious worship and opinion; 4th.—The equal distribution of estates; and 5th.—Protection in civil liberty. It also provided for the appointment of a governor who should likewise be commander of the militia, a secretary, and for three judges. The governor and the judges were to have the power to adopt and publish such of the laws of other states as should be suitable to their circumstances. Whenever there should be 5,000 free male inhabitants, of full age, in the district, they were to have authority to elect representatives to a General Assembly, which was to consist of the Governor, a Legislative Council and a House of Representatives. There was the further provision that not less than three nor more than five states were to be formed out of the territory, the states to be admitted to equal standing with the original states of the Union whenever they had a population of 60,000, or sooner if consistent with the general interest. The principles embodied in the ordinance were in the form of a compact irrevocable save by consent of both Congress and the states that should be formed out of the territory. It was by reason of this fact that the South was afterwards powerless when they endeavored to have the territory opened to the admission of slavery.

In October, 1787, Congress appointed Gen. Arthur St. Clair, who had been an officer in the Revolution, governor of the new territory, Winthrop Sargeant, secretary, and Samuel H. Parsons, John Armstrong, and James M. Varnum, judges. Subsequently Armstrong declined the appointment and John Cleves Symmes was given his place. Governor St. Clair arrived at the Marietta settlement on July 9, 1788, and immediately began his duties. On the 25th, the first law, relating to the militia, was published, and the next day the governor issued a proclamation creating all the country that had been ceded by the Indians, east of the Scioto River, into the county of Washington. After organizing the militia he next erected the Courts of Probate and Quarter Sessions, and proceeded to appoint civil officers. Rufus Putnam, Benjamin Tupper and Winthrop Sargeant, were made justices of the peace. The 30th day of August, the day the Court of Quarter Sessions was appointed, Archibald Cary, Isaac Pierce and Thomas Lord were also appointed justices. Return Jonathan Meigs was appointed clerk of this Court of Quarter Sessions. Ebenezer Sprout was appointed sheriff of Washington County and also colonel of the militia; William Callis, clerk of the Supreme Court; Rufus Putnam, judge of the Probate Court, and Return J. Meigs, Jr., clerk.

On September 2nd, the first court was held. It is thus described by the *American Pioneer*: "The procession was formed at the Point (where most of the settlers resided), in the following order: The high sheriff, with his drawn sword; the citizens; the officers of the garrison at Fort Harmar; the members of the bar; the supreme judges; the governor and clergymen; the newly appointed judges of the Court of Common Pleas, Generals Rufus Putnam and Benjamin Tupper.

"They marched up the path that had been cleared through the forest to Campus Martius Hall (stockade), where the whole counter-marched, and the judges, Putnam and Tupper, took their seats. The clergyman, Rev. Dr. Cutler, then invoked the divine blessing. The sheriff, Ebenezer Sproat, proclaimed with his solemn 'Oh yes' that a court is open for the administration of even-handed justice to the poor and to the rich, to the guilty and to the innocent, without respect of persons; none to be punished without a trial of their peers, and then in pursuance of the laws and the evidence in the case.

"Although the scene was exhibited thus early in the settlement of the West, few ever equaled it in the dignity and exalted character of its princi[illegible] participators. Many of them belo[illegible] history of our country in the darkest as well as the most splendid period of the Revolutionary war."

About the 1st of January, 1790, Governor St. Clair, with his officers, went to Fort Washington, on the present site of Cincinnati, and established the county of Hamilton, in which was comprised all the country contiguous to the Ohio, from the Hocking River to the Great Miami. He also appointed a corps of civil and military officers and erected a Court of Quarter Sessions. A short time later he likewise organized the county of St. Clair, whose limits, however, were comprised within the present State of Indiana, and Illinois, including the country from the Wabash to the Mississippi. Before the close of 1795 the governor and the judges published sixty-four statutes. Among other things they provided that the common law of England, and all its statutes made previous to the fourth year of James I., should be of full force in the territory. Wayne County was organized in 1796, Jefferson and Adams in 1797, and Ross in 1798.

Wayne County, established by proclamation August 13, 1796, embraced a large extent of territory. It began at the mouth of the Cuyahoga River, and extended south along the western border of Washington County to Fort Lawrence; thence west to the eastern border of Hamilton County; thence north-north-west to the site of Fort Wayne; then west north to the southern shore of Lake Michigan; then along the shore to the north part thereof, including the lands along the streams falling into the lake; then north to the territorial boundary of Lake Superior, and with said boundary through Lakes Huron, St. Clair and Erie to the place of beginning. This vast region, then known as Wayne County, included most of the State of Ohio, the eastern part of the State of Indiana and the whole of Michigan, and it remained as such until the admission of Ohio into the Union as a State in 1893. Then that portion of the so-called Wayne County included in the limits of the State of Ohio, was divided into various counties under the state government. The north portion of Ohio remained unorganized until February 12, 1820. Explorers and hunters had reported that the country was worthless from the fact that it would cost more to remove the heavy timber from the land than the latter would be worth after its removal, and that even after the timber had been taken off the ground was too flat and wet for agriculture.

As has before been stated, the Ordinance of 1787 provided that whenever there should be 5,000 persons in the territory they should be entitled to a representative assembly. On October 29, 1798, Governor St. Clair proclaimed that the population had reached the required number, and ordered an election for the third Monday in December. The representatives thus elected met in Cincinnati, January 22, 1799, and, under the provisions of the Ordinance, nominated ten persons, from whom the President should select five to constitute the Legislative Council. The persons chosen were: Jacob Burnet, James Finley, Henry Vanderburgh, Robert Oliver and David Vance. The Territorial Legislature again met at Cincinnati on the 24th of September, when a great amount of business was done. They repealed some of the laws that were already in force, adopted others, created and filled new offices and devised various plans and methods for carrying on the government of the new territory. The only lawyer in the body was Mr. Burnet, upon whom, by reason of his profession, a great amount of the work devolved. He seems to have acquitted himself well in the position in which he was thus placed. The whole number of acts passed and approved by the governor was thirty-seven. It is worthy of note that a bill authorizing a lottery was passed by the Council but rejected by the Legislature.

Among other duties which devolved on this session of the Legislature was the election of a delegate to Congress. The choice fell upon William Henry Harrison, the secretary of the territory at that time. He at once resigned his office and proceeded to Philadelphia to take his seat in Congress which was then in session. He was successful in obtaining many important advantages for his constituents, among others a measure subdividing the surveys of the public lands and permitting them to be sold in smaller tracts, thus making it possible for them to be purchased by individuals without first coming into the hands of speculators.

At this first session of the Legislature Governor St. Clair saw fit to veto eleven acts which were passed by it. The greater part of them related to formation of new counties, a right which the governor claimed was vested in him alone. The attitude of the governor served to increase his unpopularity with the people, whose confidence he seems to have lost, in large measure, after his disastrous defeat at the hands of the Indians.

In the year 1800 Congress took up the matter of dividing the Northwest Territory into two parts. The great extent of the territory rendered extremely difficult and unsatisfactory the operations of the government. By reason of the loose administration of justice in its western part, that portion had become a rendezvous for criminals of various character, with the consequent effect of deterring better citizens from settling there. The judiciary was likewise wholly inefficient as regarded civil cases. The far western frontier, being at such a great distance from the seat of both the national and territorial governments, could neither feel for them the attachment or fear their restraint to the extent that a closer relation would establish. In consequence, on the 7th of May an act was passed dividing the territory, the line of division being "a line beginning at the Ohio, opposite to the mouth of the Kentucky River, and running thence to Fort Recovery, and thence north until it intersects the territorial line between the United States and Canada." The same form of government was provided for the new territory as prevailed in the old. Chillicothe was made the seat of government for the old territory and St. Clair retained as governor, while St. Vincent's on the Wabash River, was made the capital of the "Indiana Territory," and William Henry Harrison appointed its governor.

ORGANIZATION OF THE STATE OF OHIO.

The second session of the General Assembly was held at Chillicothe in 1801. Governor St. Clair had, meanwhile, been growing more and more unpopular. The abuse heaped on the governor and the Legislature at Chillicothe became so great that they decided to remove the capital from that place to Cincinnati. Out of this agitation, however, and the general discontent with the governor, there had been rapidly arising a general sentiment in favor of the formation of a State government. This sentiment was in a minority, however, so far as the General Assembly was concerned. A measure was introduced there proposing that the Ordinance of 1787 be so changed that the Scioto River, together with a line drawn from its intersection with the Indian boundary to the western extremity of the Reserve, should be the western limit of the most eastern State to be formed out of the territory. To protest against this proposition the minority sent Thomas Worthington to Washington. While he was on his way a resolution introduced into the Legislature for choosing a committee to address Congress with regard to the proposed state was defeated. A further attempt providing for taking the census of the territory was postponed by the Council.

Worthington, however, was successful in his mission to Congress, and on the 30th of April that body authorized the calling of a state convention for the purpose of forming a constitution, provided it was found expedient. "The act of Congress, providing for the admission of the new state into the Union, offered certain propositions to the people. These were, first, that Section Sixteen in each township, or, where that section had been disposed of, other contiguous and equivalent lands, should be granted to the inhabitants for the use of schools; second, that thirty-eight sections of land, where salt springs had been found, of which one township was situated on the Scioto, one section on the Muskingum, and one section in the United States Military Tract, should be granted to the state, never to be sold or leased, however, for a longer term than ten years; and third, that one twentieth of the proceeds of the public lands sold within the state, should be applied to the construction of roads from the Atlantic, to and through the same." These propositions were offered on the condition that the convention should provide, by ordinance, that all lands sold by the United States after the 30th day of June, 1802, should be exempt from taxation by the state for five years after sale.

The convention met at Chillicothe on the 1st day of November, 1802. While it believed the consideration offered to the state hardly sufficient for the tax exemption required, it decided to accept the conditions of Congress, providing their propositions should be sufficiently enlarged "so as to vest in the state, for the use of schools, Section Sixteen in each township sold by the United States, and three other tracts of land, equal in quantity, respectively, to one thirty-sixth of the Virginia Reservation, of the United States Military Tract, and of the Connecticut Reserve, and to give three per centum of the proceeds of the public lands sold within the state, to be applied under the direction of the Legislature, to roads in Ohio." Congress acceded to this modification and there was thus nothing to prevent the formation of the new state.

The time for the meeting of the General Assembly came while the constitutional convention was in session, but, owing to the probability that the territorial government would so soon be superseded by that of the state, they deferred meeting. On the 29th of November the convention having framed a constitution and completed its labors, adjourned. The constitution, though never submitted to the people, was submitted to Congress and accepted by that body, and an act passed admitting Ohio to the Union, February 19, 1803. The constitution framed by this convention continued in force until the adoption, in 1851, of the present one. The territorial government ended and the state government began on March 1, 1803.

By the new constitution it was provided that the first elections under the new government should be held the second Tuesday of January, 1803. Accordingly at that time Edward Tiffin was chosen governor and Jeremiah Morrow sent to Congress. A General Assembly was also elected, which met on March 3rd and chose the following officers: Michael Baldwin, speaker of the House, and Nathaniel Massie of the Senate; William Creighton, Jr., secretary of state; Colonel Thomas Gibson, auditor; William McFarland, treasurer; Return J. Meigs, Jr., Samuel Huntington and William Spriggs, judges of the Supreme Court; Francis Dunlevy, Wyllys Silliman and Calvin Pease, president judges of the First, Second and Third Districts, and Thomas Worthington and John Smith, United States Senators. The Assembly also passed such laws as were necessary. Up to the time of the adoption of the state constitution there had been organized the following counties: Washington, July 27, 1788; Hamilton, January 2, 1790; Adams, July 10, 1797; Jefferson, July 29, 1797; Ross, August 20, 1798; Clermont, Fairfield and Trumbull, December 9, 1800; Belmont, September 7, 1801. Eight additional counties were created by the Assembly at its first session, viz.: Gallia, Scioto, Butler, Warren, Greene, Montgomery, Franklin and Columbiana.

The seat of government was first located at Chillicothe. In the year 1810 an act was passed changing its location to Zanesville, but at the next session of the General Assembly it was again taken back to Chillicothe, and commissioners appointed to determine upon a definite location. It is said that they first reported in favor of Dublin, a small town on the Scioto about fourteen miles above Columbus. At the session of the Assembly of 1813-14, however, the proposal of parties owning the site of Columbus was accepted and in 1816, the first meeting of the Assembly was held there.

CHAPTER II.

THE ABORIGINES.

Prehistoric Races—Pre-Glacial Man—The Mound Builders—The Red Race.

Hancock County may have been the home of man before the glacial period. There seems to be evidence, at least, that Ohio was occupied by human beings prior to this great geological epoch. Paleoliths have been found in the Little Miami Valley similar and under similar conditions to those unearthed by Dr. Abbott in the glacial terraces of the Delaware River. As to whether pre-glacial man ever had a home in Hancock County, however, in our present state of knowledge, could be nothing more than a matter of profitless speculation.

That the Mound-Builder lived here there is abundant evidence. The State of Ohio itself, from the standpoint of pre-historic occupation, is one of the most interesting portions of the entire globe. In no other equal area have so many of the Mound-Builder's works, consisting of fortifications, effigies, mounds, etc., been found. On this point we quote from the recent work of Gerard Fowke on the "Archeological History of Ohio." "The total number of mounds in Ohio has been estimated at ten thousand. This is probably under rather than over the correct figure; for while they are almost unknown in the northwestern counties and are comparatively scarce in some parts of the rugged hill lands of the south and southeast and along the main watersheds, there is scarcely a township in any other part where they are not found. In the neighborhood of every stream in the southern half of the State, except some of those flowing through rough or swampy country, the surface is so dotted with them that signals could be transmitted from one to another for a hundred miles or more. There is scarcely a point along the Scioto below Circleville, or on either Miami in the lower half of its course, or in the valley of any tributary to these streams, where one may not be within a few minutes' ride of some permanent evidence of aboriginal habitation. The same is true of the Cuyahoga and some other rivers belonging to the Lake Erie basin. On the summits of steep hills; in bottom lands subject to overflow, on every terrace bordering a stream; on plateaus and uplands; wherever there is cultivable or naturally drained land, a good point of observation, an ample supply of water, a convenient topography for trails—the Mound-Builder has left his mark. Even in places where it would seem a nomad would not care to go, except as led by excitement or the necessities of the chase, and then for as brief a time as possible, such evidence is not lacking of pre-historic residence, or, at least, sojourning."

"The most notable mounds in the State are: The Serpent Mound, in Adams County, which is more than a thousand feet in length; Fort Ancient, in Warren County, the length of whose surrounding embankment is about five miles, and estimated to contain 628,800 cubic yards of material; Fort Hill, in Highland County, enclosing an area of thirty-five acres; Graded Way, in Pike County; and fortifications at Newark covering over a thousand acres. The largest mound in the State, at Miamisburg, is sixty-eight feet in height and 800 feet in circumference at the base."

While Hancock County possesses none of these more important of the works of the Mound-Builders, and while there is nothing characteristic in the mounds and earthworks found in the county to distinguish them from those in many other parts of the State, yet there are many interesting evidences that these people once lived within the limits of the county.

The tumuli in this part of the state were each about five feet high and thirty feet in diameter, and upon being opened exhibited the same evidence of construction and contents as previously stated. Three of these mounds were located northeast of Cannonsburg in Union Township; two on Section 11, and one on Section 13, in Orange Township; one on Section 21, Liberty Township, and one on Section 11 in Delaware Township. This list has heretofore been published in papers and histories but in addition to this list, there is a very distinct mound still in existence on Section 18, Allen Township; and taking the Archaeological Society as authority (vol. 5, p. 272), there are two mounds in Blanchard Township and one in Pleasant. Those in Orange and Union Townships were opened by William M. McKinley and LaFayette Ballard, who found human remains in each mound, also flint arrow heads and other implements of stone, some of which are in the possession of the McKinleys. No doubt many more mounds existed in other townships of Hancock County, which the plow has long ago obliterated. Numerous evidence of this strange people cannot be looked for here, but that they once inhabited the valley of the Blanchard is beyond all doubt.

The Mound-Builders have long since passed away. Aside from the earthworks which they constructed and the relics found within them, no source of information remains to us by which to determine anything as to their character, history or fate. Even the Indians themselves had practically no traditions concerning them. All the research and investigation that has been made has led to no definite or reliable conclusions. Theories have been propounded only to be discredited by later discoveries. Whether the Mound-Builders were a race distinct in themselves, ultimately conquered and exterminated by the Indians, or whether they were simply the progenitors of the Indian tribes, are questions which remain unanswered and are destined, perhaps, always to be so.

THE RED RACE.

Of the successors to the Mound-Builders, however, considerably more is known. Indeed it has not been much over a hundred years since the only residents of Hancock County were the red men, and a hundred years is a period comparatively brief when we consider the length of time that has elapsed since the date where historical knowledge begins. It is scarcely correct, however, to speak of the Red Men as residents. The term implies a more permanent attachment to a locality than could be attributed to them. With their nomadic habits, they were not long confined to a single place, and we find the various tribes wandering over widely extended areas.

When the white man first came to the Ohio Valley he found a number of tribes inhabiting the Northwest Territory, among them the Delawares, Shawnees, Miamis, Mingoes, Munsees, Wyandots, Senecas, and perhaps others.

The Delawares took their name from the Delaware River on the banks of which they were located when first discovered by the Europeans, and which, in turn, took its name from Lord De la Warre, who first explored it. Their real name, however, was Lenni Lenape. According to the traditions of the Lenni Lenape, their organization antedated that of most of the other Indian tribes, also that they had once occupied the western part of the country, but, crossing the Mississippi, had gradually moved eastward until they had taken up a more permanent abode on the river which gave them their English name. In the course of their migration eastward they had exterminated the Allegans who occupied the principal ranges of the Allegheny Mountains. They had formed an alliance with the Iroquois by whom they were afterward subdued and reduced to "women." Whatever truth there may have been in their traditions, however, when the European settler came, they were found on the banks of the Delaware.

William Penn met them in friendly intercourse and negotiated with them a treaty by which he bought their lands, and by which both parties agreed that the same moral law should apply to both races alike. This treaty was kept unbroken by the Delawares for sixty years. So favorable was the impression made upon them by Penn's fairness that the name "Quaker" came, with them, to be synonymous with "good men."

At the time of the treaty with Penn, however, or shortly afterwards, the Delawares were brought into subjection to the Iroquois. At the Lancaster treaty in 1744, in the presence of a large assembly of tribes, the Iroquois denied the right of the Delawares to sell their lands. "Canassatego, an Iroquois chief, upbraided them in public council for some former act of this kind. Speaking in a strain of mixed irony and arrogance, he told them not to reply to his words but to leave the council in silence. He peremptorily ordered them to quit the section of the country where they then resided and to move to the banks of the Susquehanna." Accordingly, the Delawares, cowed into submission, left the banks of the Delaware where their home had been for many years and turned to the West, from which, according to their traditions, they had formerly come. It is said that at the opening of the Revolution the Delawares shook off the Iroquois yoke and that, a few years later, at a public council, the Iroquois admitted that they were "no longer women."

About 1650 the Eries held full sway of the northern portion of what is now Ohio. They lived along the southern border of the lake which bears their name, but being conquered by the Iroquois five years later, most of them fell on the field of battle, while the remainder became incorporated with other tribes, and drifted southward and westward. In the early part of the seventeenth century the Shawnees were living along the Ohio Valley, but they were dispersed by the Iroquois, and dispossessed of their happy and prolific hunting grounds. For many years before and after the year 1700 this entire wilderness was inhabited by the remnants of defeated tribes, who were permitted to remain through the leniency of their conquerers.

In 1750, however, we find something like permanent occupation in northwest and other portions of what is now Ohio, by the Wyandots, Delawares, Shawnees, Miamis, Munsees, Ottawas and Mingoes. The Wyandots then inhabited the valley of the Sandusky River and its tributaries, and dwelt around Sandusky Bay, and streams flowing into the lake. The Delawares and Munsees occupied the Muskingum Valley. The Shawnees lived along the Scioto, from the Ohio to the Scioto marsh, and also had a few scattering towns along the Miami and Mad Rivers. The Miamis occupied the territory drained by the head waters of the Maumee, Wabash and Great Miami Rivers, from the Loramie portage to Ft. Wayne and down the Maumee Valley. The Ottawas were scattered along the lower Blanchard, Auglaize and Maumee Rivers, and around the western end of Lake Erie, while the Mingoes were settled in the eastern and northeastern portion of the state.

On the 29th of September, 1817, a treaty was made at the foot of the Maumee Rapids, with the Wyandots, Ottawas, Shawnees, Delawares, Senecas, Pottawotomies and Chippewas, and all lands in this state remaining in possession of the Indians were ceded to the United States. Certain reservations were set aside by this treaty for the use of the several Indian tribes, to which large additions were made by a treaty concluded at St. Mary's, Ohio, with the Wyandots, Senecas, Shawnees and Ottawas, September 17, 1819.

The Wyandot reservation embraced a tract of twelve miles square near Upper Sandusky, Ohio; one mile square on Broken Sword Creek; 55,680 acres lying on the north and east of Upper Sandusky Reserve, and 16,000 acres surrounding the Big Spring at the end of the marsh, in what is now the southwest corner of Seneca County and the line into Big Lick Township, Hancock County, the last mentioned tract being for the use of the Wyandots residing at Solomon's Town on the Blanchards fork. The reservations located in Logan, Auglaize, Seneca, Hancock and Sandusky Counties were purchased from the Indians in 1831. In March, 1842, the Wyandots ceded their land to the government. The territory embraced in Hancock County lay between the Indian towns in what is now Seneca and Wyandot counties, and those located on the Blanchard, Auglaize, and Maumee Rivers. It was a portion of the hunting grounds of the Wyandots and Ottawas, the former of whom had a small village on the site of Findlay, and cultivated corn along the river within the present limits of the city. Howe, in his "Historical Collections," speaking of the settlement of Wilson Vance at Fort Findlay, in 1821, says: "There were then some ten or fifteen Wyandot families in the place, who had made improvements. They were a temperate, fine-looking people, and friendly to the first settlers." However, some histories and authorities have since refuted this statement. As a tribe they were practically all gone in 1818, but for years after, scattering remnants were still located in Hancock County.

According to tradition there were two Indian villages in this county, and both were located on the banks of the Blanchard. In 1815, there were eight or ten families of friendly Wyandots living around and in the blockhouses of Fort Findlay. They tilled two fields, one above and the other below the fort, on the south bank of the Blanchard. Kuqua was the chief, and one of his sons, Tree-top-in-the-Water, died in a cabin west of the fort before the Indians removed to the Big Spring reservation. Six or seven miles down the river, the Wyandots had another village, called Indian Green. This was a clearing about twelve acres square, which had apparently been under cultivation, since an orchard of plum trees was found near the part of the clearing occupied by the graveyard. It has been claimed that earthworks ran along the brows of the hill overlooking the river, but recent investigation does not fully bear out this statement. A man by the name of Ellison settled on the clearing and was found out to have robbed the dead braves of their jewels, which were to have given them the means of purchasing a clear title to their share of plunder in the Happy Hunting Grounds. The Indians, who kept a close watch on the dead, soon discovered his meddling and made it expedient for the man to leave the county immediately. From various relics which have been discovered at this place, there may have been a battle of some sort at Indian Green. In fact, some historians have gone so far as to assert that General Wayne gave the Indians at this place a startling surprise on his way to and from the Battle of the Maumee in 1794. However, this is in very much doubt, as Wayne left Greenville and started north, where he established Fort Recovery; from thence he went to the junction of the Maumee and Auglaize Rivers and established Fort Defiance; thence down the Maumee to the rapids, where he defeated the Indians and returned to Greenville. It is probable that either Wayne's entire army or some portion of it came far enough east on their march back from the "Battle of the Maumee" to reach "Indian Green" and may here have had an encounter with the red men, doubtless to the disadvantage of the latter.

There have been statements made to the effect that an Indian village was located on the site of Mt. Blanchard, which may be considered as probably true, as there were Indians in the vicinity of Mt. Blanchard as late as 1838. They were probably the remnants of some of the tribes who at different times and in different localities held sway over this vast wilderness. But with civilization's resistless march, fewer and fewer became the red men in this section of the country, until now there is no remaining vestige to mark their former habitations, except as some weapon or ornament has uncovered its form from a dark and lonely bed in Mother Earth, and fallen into the hands of the relic hunter of today.

CHAPTER III.

FIRST ORGANIZATION OF HANCOCK COUNTY.

The County Organized—Findlay Township Organized—First Elections—First Officials—Erection of the Townships.

On the 12th of February, 1820, the general assembly of Ohio passed an "Act for the Erection of Certain Counties Named Therein." In that act we find the following reference to Hancock County: * * * "Fifth to include Townships One and Two, north of the forty-first degree of north latitude (base line) and One and Two south of the same line, in the Ninth, Tenth, Eleventh and Twelfth Ranges from east to west, and to be known by the name of Hancock County." Section Second of the same act provided, "That the counties of Hancock, Henry, Putnam, Paulding and Williams shall be attached to the county of Wood" with the seat of government at Perrysburg.

The following order was made by the commissioners of Wood County, March 4, 1822: "Ordered by the board, that the Township of Waynesfield, within the jurisdiction of the county of Wood be co-extensive with the boundaries of Wood and Hancock, and to include the same." On May 18, 1823, the commissioners of Wood County ordered that, "So much of the township of Waynesfield as is included in the unorganized county of Hancock, be set off and organized, and the same is hereby organized into a township by the name of Findlay, and that the election of township officers be held on the first day of July, A. D. 1823, at the house of Wilson Vance, in said township. Of this proceedings no record is known, but the first record of the township is that of the election of April 5, 1824, at which time there were 18 votes cast, and that Job Chamberlain, Wilson Vance and Jacob Poe were elected trustees; Matthew Reighly, clerk, and Wilson Vance assessor; Phillip McKinnis, constable; John Hunter and John Gardner, fence viewers; Robert McKinnis and William Moreland, overseers of the poor; and Job Chamberlain, Sr., treasurer. The treasurer's office in those days was practically a sinecure, as the total amount of tax for 1826 was but $56.12. Of course the salary attached to it was small.

It was not long, however, owing to the rapidity with which the different townships were being settled, before a separate county organization became necessary, and accordingly on the 21st day of January, 1828, the General Assembly of the State of Ohio passed an act entitled, "An Act to Organize the County of Hancock," of which the following are some of its provisions:

"Sec. 1. That the county of Hancock as heretofore laid off, and the same shall be and is hereby organized into a separate and distinct county, and suits and prosecutions which shall be pending, and all crimes which shall have been committed within said county of Hancock previous to its organization, shall be prosecuted to final judgment and execution within the county of Wood, in the same manner they would have been had the county of Hancock not been organized; and the sheriff, coroner and constables of Wood County shall execute within the county of Hancock such process as shall be necessary to carry into effect such suits, prosecutions and judgments; and the treasurer of Wood County shall collect all such taxes as shall have been levied and imposed within the county of Hancock previous to the taking effect of this act."

"Sec. 2. That all justices of the peace and constables within the said county of Hancock shall continue to execute the duties of their respective offices in the same manner as if the county of Hancock had remained attached to the county of Wood."

"Sec. 3. That on the first Monday of April next the legal voters within the county of Hancock shall assemble within their respective townships at the place of holding elections, and shall elect their several county officers, who shall hold their offices until the next annual election.

"This act shall take effect from and after the first day of March next."

In accordance with the provisions of this act, the voters of Hancock County met in Findlay and proceeded to hold an election. There were 74 votes cast, and officers were elected as follows: Don Alonzo Hamlin, sheriff; Thomas Slight, coroner; Matthew Reighly, auditor; Joshua Hedges, treasurer; William Hackney, assessor; Godfrey Wolford, John Long and John P. Hamilton, commissioners.

ERECTION OF THE TOWNSHIPS.

In order to make correct surveys and locate lands prior to the settlement of the state or of the formation of counties or townships, or the subdivision of townships into sections, the general government found it necessary to have a certain and fixed point from which townships and ranges might be counted. The Ohio survey was made in 1819 and 1820, after the fixing by the Government of the first principal meridian (as it was called), which meridian commences at the mouth of the Great Miami River, running from thence north on the line between Ohio and Indiana to the Michigan line. A line was also established running east and west on the 41st parallel of north latitude, and called the base line. This base line runs directly through the center of Hancock County, three miles south of Sandusky street, dividing it into two parts, north and south. The townships are numbered north and south from the base line; those bordering on the line are called township number one, north and south—number two coming next, and so on. The ranges, which include an original township in width, or six miles, are numbered from the principal meridian, east, beginning with number one, at the Indiana line and numbering east. Hancock County is in Ranges Nine, Ten, Eleven and Twelve.

A search of the records has failed to reveal the date or definite boundaries of the sub-divisions of Hancock County prior to 1829; however, the various entries on the commissioners' journal establish the fact that the county was divided into three townships, soon after the independent organization, namely: Findlay, Amanda and Welfare, of which Findlay was much the largest.

In response to a petition from a large majority of the citizens of Welfare Township, situated in the southeastern portion of the county, the name was changed from Welfare to that of Delaware.

December 7, 1829, the original surveyed township No. 1, south in Range 11 east, was set off into a body politic and corporate and called Jackson, in honor of Andrew Jackson, this change reducing the dimensions of Findlay Township, which previously occupied two-thirds or more of the county in the northern, western and southwestern portions.

The next change was made December 6, 1830, when the county commissioners divided the township of Findlay in the following manner: Beginning at the southwest corner of Section 31, in Township 1 north, in Range 12; thence north to the northwest corner of Section 6, in Township 2, in Range 12; thence west to the northwest corner of Section 4 in Range 11; thence south to the southwest corner of Section 33 in Township 1 north, in Range 11; thence east to the place of beginning; which bounds shall be a separate township and shall be known and designated by the name of Marion. And in the next place, commencing at the southeast corner of Section 32, Township 1 north, Range 11 east; thence north to the northeast corner of Section 5, in Township 2 north, in Range 11; thence west to the northwest corner of Section 2, in Range 10; thence south to the southwest corner of Section 35, in Township 2 south; thence east to the southeast corner of Section 36, in Range 10; thence north to the southeast corner of Section 36, in Township 1 north; thence east to the place of beginning; which shall be a body corporate and politic, and retain the name of Findlay.

And in the next place, commencing at the southeast corner of Section 34, in Township 2 south, in Range 10; thence north to the northeast corner of Section 3, Township 2 north; thence west to the northwest corner of Section 6, in Range 9; thence south to the southwest corner of Section 39, in Township 2 south; thence east to the place of beginning; in which bounds shall be made a separate township and be known and designated by the name of Liberty.

March 7, 1831, agreeable to a petition of sundry inhabitants of Hancock County, the original surveyed Townships Nos. 1 and 2 south, in Range 10 east, were set off to be known and designated as Van Buren Township.

On the same day the county commissioners also ordered that hereafter the township of Amanda shall consist of the original Township 1 south, in Range 12 east, and Sections 34 and 35 in the original surveyed Township 1 north, Range 12 east; also that the original surveyed Township 1 north, in Range 12 east, except Sections 34 and 35, shall hereafter be known and organized by the name of Biglick; also the original surveyed Township 1 north, in Range 9 east, shall be known and organized by the name of Blanchard.

March 5, 1832, the county commissioners set off the original surveyed Township No. 2 north, in Range 12 east, into a body corporate and politic, and named it Washington Township.

June 4, 1832, the county commissioners set off the original surveyed Township No. 1 south, in Range 9 east, into a body corporate and politic, and named the same Union Township.

December 3, 1832, the county commissioners off the original surveyed township No. 1 south, in Range 10 east, into a body corporate and politic, and named the same Eagle Township.

March 4, 1833, the county commissioners set off the original surveyed Township No. 2 north, Range 11 east, into a body corporate and politic and to be known by the name of Cass. On the same date it was also ordered that the original surveyed Township No. 2 north, Range 10 east, be set off into a separate township and named Portage.

June 3, 1833, the county commissioners ordered that Biglick Township shall include all of the original surveyed Township No. 1 north, Range 12 east.

March 2, 1835, the county commissioners ordered that the original surveyed Township No. 2 north, in Range 9 east, be set off into a separate and distinct township and called Pleasant. Also that the original surveyed Township No. 2 south, Range 12 east, be set off into a separate and distinct township and called Richland.

December 5, 1836, the county commissioners ordered that the original surveyed Township No. 2 south, Range 9 east, be set off into a separate and distinct township and called Orange.

June 5, 1838, on the petition of Andrew Thompson and others, it was ordered by the commissioners that Sections 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36, Biglick Township, and Sections 1, 2, 3, 4, 5, 6, 11, 12, 13 and 14, Amanda Township, be and the same is hereby set off into a separate township, politic and corporate, and named Ridge.

June 1, 1840, the county commissioners ordered that Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31 and 32, in Township No. 2 south, Range 11 east, and Sections numbered 1, 2, 11, 12, 13, 14, 23, 24, 25, 26, 35 and 36, in Township No. 2 south, Range 10 east, be set off and created as a new township to be called Madison.

February 3, 1845, the Legislature of Ohio passed an act organizing the county of Wyandot, and Sections 1, 2, 11, 12, 13, 14, 22, 23, 24, 25, 26, 27, 34, 35 and 36, in Township 1 south, Range 12 east, and Sections 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 32, 33, 34, 35 and 36 in Township 2 south, Range 12 east, were taken from Hancock County and formed a portion of Wyandot County.

March 5, 1845, the county commissioners ordered that sections 6, 7, 18, 19, 30 and 31, in Township 2 south, Range 12 east, be attached to Delaware Township; also that Sections 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36, in Township 1 north, Range 12 east, be attached to Biglick Township; also that Sections 3, 4, 5 and 6, in Township 1 south, Range 12 east, and Sections 1, 12, 13, 24, 25 and 36, in Township 1 south, Range 11 east, be attached to Amanda Township.

June 3, 1850, the county commissioners ordered that a new township be erected out of the following territory called Allen Township, the said Township of Allen to be comprised of Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31 and 32, of Township No. 2 north, Range 11 east, and Sections 1, 2, 11, 12, 13, 14, 23, 24, 25, 26, 35 and 36, of Township No. 2 north, Range 10 east, thus forming the county as it appears at the present day.

CHAPTER IV.

INDEPENDENT ORGANIZATION OF THE COUNTY.

First White Settlers—Hull's March—Fort Findlay—Murder of the Thomases—A Pioneer's Letter—Observance of the Golden Rule Among the Pioneers—Mrs. Ebberly's Narrative—First Election Under Independent County Organization—Poll Book of Election and County Officers.

According to the most authentic account, the first white settlement in the territory now embraced within the limits of Hancock County, was made at the present site of the town of Findlay, about the year 1815. We have a tradition to the effect, however, that a man by the name of Thorp or Tharp, came here with the soldiers, who occupied Fort Findlay in the War of 1812-15, and remained here after its evacuation, either living alone or with the Indians, but not much is known of him. A young soldier who came to Fort Findlay, by the name of Edward Bright, tiring of the monotony of fort life often wandered through the unbroken forests then covering the entire country, and especially did he take frequent strolls on the higher grounds of what is now Marion Township. Young Bright took a fancy to the land in Section 11 in that township because it was higher and not swampy, as was much of the ground at that time, and he marked the trees in that neighborhood for future selection of a farm. Ten years after, or about 1824, he returned from his home in Fairfield County and entered 160 acres of land in Section 11, moved onto it and cleared it up. He was industrious, spending very little for luxuries and none too much for necessaries; in fact he ate very simple food and wore scanty clothing. At about the time of the breaking out of the Civil War he bred and sold many fine cattle and sold them at a high price, and people thought him possessed of much gold, but after his death no money was found on his person or about the house, and it was believed at that time, and is to this day that he buried his treasure in the ground and never revealed its hiding-place. He was a very quiet man, discreet in his conversation but not discourteous in his manners. In his elderly days he was known as "Uncle Neddie" or "Old Neddie." He never married. His scantily appointed cabin stood on the site of Dr. J. C. Trich's beautiful log cabin about four miles out on the Tiffin road.

To Benjamin Cox and his family belongs the honor of being the first white family to settle in this vicinity. Upon their arrival, naught but an unbroken forest, save in the immediate vicinity of the old fort, greeted them. Indians and wild beasts roamed the woods, with no neighbors within many days' journey, perhaps. After making this solitude their home for a few years, the family removed to Wood County, where some of them were still living in 1882, though at present no trace of any of them can be discovered. One of the daughters had a knowledge of both the Ottawa and Wyandotte tongues and sometimes acted as interpreter between the whites and the Indians.

But the Coxes had not been here long when others, through a spirit of adventure, or restless desire for new scenes, came and formed settlements. Some were attracted by the richness of the soil, or perhaps a greater part by the abundance of game, hunting and trapping wild animals being their main occupation. Or perhaps with imaginations reaching out to the future, they pictured to themselves the exceeding loveliness, and fruitfulness of the land, when redeemed from the wilderness, and were hopefully constrained to make this their abiding place.

Thus, by whatever motive actuated, they came and formed settlements, cleared the forests, built themselves cabins, constructed roads such as they were, and laid the foundation deep and permanent, for our present great prosperity and wealth, transmitting to their children a rich and beautiful inheritance. Little did they then think or even dream of the wealth of petroleum and gas laying a quarter of a mile beneath their feet, and which, in its development brought millions of wealth to Hancock and Wood Counties. But even if it had been discovered, there would not have been the money or facilities to have developed the discovery.

HULL'S MARCH.

An exciting event occurred about the middle of June, 1812, when the army, under Gen. Hull, left Urbana, Champaign County, Ohio, and passed north through the present counties of Logan, Hardin, Hancock and Wood, over what was known during, and after the war, as "Hull's Trail," into Michigan. This army cut a road through the unbroken wilderness, on their route building Fort McArthur, on the Scioto River in Hardin County, and Fort Findlay, on the Blanchard River in Hancock County. In the same summer General Edmund W. Tupper, of Gallia County, enlisted about 1,000 men for six months' service, mainly from Gallia, Lawrence and Jackson Counties, who, under orders of General Winchester, marched from Urbana north by "Hull's Trail" to the foot of the Maumee Rapids. The enemy attacked Tupper's forces, but were driven off with considerable loss. They returned to Detroit, and the Americans, under Tupper, marched back to Fort McArthur.

FORT FINDLAY.

The Fort at Findlay was erected by Col. James Findlay, under orders from General Hull, and was named in honor of the Colonel. It was a stockade of about fifty yards square, with a blockhouse at each corner, and a ditch in front. tI stood on the south side of the Blanchard River, just west of the present iron bridge and was used as a depot for military stores. The Fort was garrisoned by a company under the command of Captain Arthur Thomas, who lived at King's Creek, three miles from Urbana. So far as known, there were no battles fought at Findlay, and the garrison duty was, no doubt, monotonous and irksome. After the close of the war, Captain Thomas' company returned to Urbana. On their journey home, the Captain and his son lost their horses, and separated from the rest of the company in search of them. They encamped at the Big Spring, near Solomonstown, about five miles from Bellefontaine, and the next morning were found murdered and scalped. Their bodies were taken to Urbana by a deputation of citizens. In connection with this account of the fate of Captain Thomas, the following letter to D. B. Beardsley, author of a former History of Hancock County (1881), and to which we have already acknowledged our obligations, will prove interesting:

MARION, IOWA, Dec. 6, 1875.

D. B. Beardsley, Esq.

DEAR SIR:—I saw in a sketch of the early history of Hancock County, Ohio, as read by you at the Second Annual Picnic and Reunion of the Pioneers of your county, published in the Findlay Jeffersonian, an account of Captain Arthur Thomas and son, that were killed by the Indians at the Big Springs, some five miles from Bellefontaine, and thinking I might furnish you an item or two, concluded to drop you a line. My father was stationed at a block house called Menary, about two miles northwest from Bellefontaine, there being a small company of soldiers, I think commanded by Lieut. John Kelley. The object seemed to be to guard and keep in bounds some pet Indians that the Government had in care, and was furnishing supplies to through an agent by the name of McPherson.

On the morning after the murder of Thomas and his son, the word was brought to the company, and a deputation was sent out after them, among whom was my father (John Rathbun) and when they reached the spot, and found them in the broiling sun, being scalped, and the blood oozing from their heads, he thought it the most sickening sight he ever beheld; and made him declare vengeance against the tawny tribe, pet or no pet. He always said that it was the pets that did the deed, for as they were returning with the men to the block house, three of the half-breeds came in sight armed and painted, contrary to orders. The horsemen took after them, and succeeded in stopping them, but the Commander would not let the Post Guard come up in shooting distance, for he knew there would have been three red-skins less in double quick.

The officers let them go with some good promises on their part, not to be found there thus arrayed again. After reaching the block house, they (the Thomases) were put into the hands of the citizens, that conveyed them to their homes and final resting place, as you have it recorded. At Roundhead there was a large village of those pets or friendly Indians, as they were called, and an order was sent out from the Post, to have them come in on a certain day, but the day came and none made their appearance; the second day none. The third day a deputation started after them, but they met them in squads coming in. They were old men, women and children, all the warriors had gone to fight for the British, except a few young men that had charge of affairs. When they reached the village, all had left but one, and he dodged out of sight in a moment's time. About all that was accomplished, was to show that while we were taking care of their families, the warriors were fighting against us.

Time passes on, the war ended, and when I reached my fourteenth year, I went to visit an uncle that lived on what was called the Blockhouse farm. The house was in rather a dilapidated condition, the roof off and half the upper story had been removed. It brought to

FINDLAY HOSPITAL AND HOME, FINDLAY

HANCOCK COUNTY COURT HOUSE, FINDLAY

POST OFFICE, FINDLAY

COUNTY JAIL, FINDLAY

mind many incidents that I had heard my father relate thirty-six years ago. I left the place of my nativity and settled in what was called the Black Hawk purchase, or Iowa. Had not been here long before I heard of the Thomas family having settled at Cascade, where the son of a brother of the Captain, and son alluded to, owned a fine mill property, and in the course of some three years I went to his mill, where I saw the whole family, the widow, her son and three or four daughters, all married except the widow. She never married, or at least not to that time. Thomas sold his mill and went further west, and I have lost sight of him. I always like to cherish in memory those who have suffered in their country's cause.

But I will close,

Yours in Pioneer Friendship,

NELSON RATHBUN.

The Greers, Lakes, Elders and Hamlins formed a settlement at the present site of Mt. Blanchard, in one of the most beautiful and fertile portions of the county, while Wilson Vance, and Carlin, and Hamilton and Johnston and the Chamberlains, with others, formed the settlement of Findlay and vicinity, and, like the others, were not disappointed in the fertility of the soil or in the natural advantages of the location. The McKinnis, the Poes, the Fishels and other kindred spirits, formed a settlement down the river from Findlay, in a most beautiful part of the county, and it was not long until these families of hardy stalwart men and women were known for their hospitality and bravery. The Moreland, Helms and a few other families formed a settlement in the south part of the county, where they resided many years, generally respected for their honesty and fair dealing.

A settlement was formed still further down the river than was the McKinnis settlement, by the Dukes brothers, John, Richard and Lewis, and by the Moffitts, and the Downings, and Groves, and Davis. These men, all farmers, were fortunate in the selection of their lands. and today there is not a richer or more beautiful farming region in north-western Ohio than is this same Dukes settlement. Todd, and Kalb, and Algire and other families settled at or near the site of the present village of McComb. At this time no one thought of any law but that of doing to others as they would others should do unto them—of dealing honestly with all men, of fulfilling every promise, of redeeming every pledge, of rendering to his neighbor, without hope of fee or reward, that assistance which was necessary—a happy state of society, but which was necessarily succeeded in time by the erection of political divisions and the machinery of organized government.

We present here, an interesting account of early days, the narrative of Mrs. Eberly, the daughter of Benjamin Cox, the pioneer already mentioned. The facts she gives were communicated by her to the late D. B. Beardsley, in an interview which he had with her in the summer of 1880, at which time she was residing with her husband about one mile east of Portage in Wood County.

MRS. EBERLY'S NARRATIVE.

"I am the daughter of Benjamin Cox, and was born in Green County, Ohio, in 1806, and when about nine years old, my father removed his family to Findlay, in Hancok County. Our family was the first white family to settle in that county. My sister Lydia, born in 1817, was the first white child born in that county. We lived in a hewed-log house, located where the brick residence of the late Wilson Vance now stands, on the south bank of the river, and on the east side of Main street. When Mr.

Vance came to the place, we had to move into a log cabin a little east of the hewed-log house, into which Mr. Vance took his family.

"My father was engaged in farming—if the cultivation of a small tract of cleared land surrounding our cabin could be called farming—and keeping a public house. Shortly after we came to the place, Hamilton, Moreland and Slight came. Some other families came in, stayed a short time and then left. For to be candid about it, Findlay was but two or three block houses, and some pickets, the remains of Ft. Findlay, were standing when we came. The Ottawa Indians made frequent visits to the place, as it was stated that they were in some way related to the Wyandots.

"Before we left Findlay, the Morelands, Hamiltons, Slights, Chamberlains, Frakes, McKinnises, Simpsons, Vances and Rileys had moved to the county. Hamilton and some others had started a settlement above the town, and Frakes and the McKinnises, below the town. I was at that time too young and too busy to make the acquaintance of many of these persons. But I shall never forget Susy Frakes—as she was called—the wife of Nathan Frakes. Many a day did I spend with them in their cabin on the river side, and I thought Susy the best woman I ever knew, kindhearted, almost to a fault, hospitable and intelligent.

"Mrs. Riley was perhaps the first white person who died in the county. She had been sick with the chills and fever and had called in the services of a Mr. Smith, a Kentuckian, who pretended to be a druggist, and who gave her medicine which was so effective that she was soon a corpse. So sudden was her decease that it was suspected that a mistake had been made, either in the medicine or in its administering. It was said at the time that Smith had forbidden her to drink water, but such was her intense thirst that she prevailed on two little girls who were left to watch with her, to bring her some, of which she drank freely, and very shortly afterwards was found dead. Of course her sudden death was attributed to the drink of water.

"I was but a girl when Vance came to Findlay. The first mill in the county was built whilst we were there. Mrs. Vance had gone to Urbana just previous to the birth of their first child, and Mr. Vance's sister, Bridget, came to keep house for him, but had been with him but a short time when she was attacked by the ague. I then went to live with them, and not only cooked for the men who were digging the mill race, and boarded at Vance's, but I even worked in the race. My mother, my sister and myself gathered the stalks of nettles which grew on the river bottoms below the town, from which we stripped fiber enough, that on being dressed like flax was spun and woven into linen to the amount of forty yards, and was made into clothing for the family.

"At one time We-ge-hah, or Tree-top-in-water, son of In-op-qua-nah, a Wyandot chief, became sick, and the Indians believed him to be bewitched by a bad spirit, and sent to Towa-town for Big Medicine to exorcise the spirit. My mother did not like the Indians very well, and never went amongst them much. On this occasion, however, when the Indians sent out their invitations for the great pow-wow, my mother received one. It was after much persuasion on the part of my father, and with the understanding that I should accompany her, that she finally consented to attend. When we arrived at the place of meeting, which was a log house a little west of where Judge Cory now lives—Blackford German Block—we found a few Indians assembled. The Big Medicine and his interpreter occupied the center of the room. The lights were extinguished. The tom-tom was beaten and a great noise and hubbub was made. The lights were again set to burning, and after a short silence refreshments were passed around. During this time my mother and myself having been seated in the circle which was formed around the room, clung closely together, not a little frightened at the performance.

"The sick man got no better. Big Medicine declared that the young chief was bewitched, and that the witch lived in Browntown, near Detroit, and that the sick man had a bunch of hair in his breast, blown there by the witch, and he must cut it out. He went into a tent alone with the young man, and afterwards produced and exhibited a knot of bloody hair which he pretended to have taken from the breast of the sick man. He said, however, that just as likely as not the old witch would find out that he had taken it out, and blow it back again, and if he did the young chief would die. The witch no doubt did so, for the young man died. The disease of which he died was no doubt the consumption.

"I am now seventy-four years old. I have seen some very hard times, but I have never seen the time that I was not happy and contended. I have not visited Findlay but once since I left there in 1825, and that was about twenty years ago. There is but one person now residing in Findlay that I remember to have been there during our stay, and that one is Job Chamberlain. When we first came to Wood County, I lived for some time in the family of Squire Carlin, who then resided there."

The following is a copy of the poll book, and abstract of the election, held April 7, 1828, in Findlay:

FIRST ELECTION.

"Poll book of the election held in the Township of Findlay, County of Hancock, on the seventh day of April in the year of our lord one thousand eight hundred and twenty-eight. Abram Huff, Wilson Vance, Mordica Hammond, Judges. John C. Wickham, Edmun S. Jones, Clerks for county officers of this election were severally sworn as the law directs, previous to their entering on the duties of their respective offices."

NUMBER AND NAMES OF ELECTORS.

1. Ephraim Elder
2. Asher Wickham
3. Samuel Sargent
4. Thomas Slight
5. William Hackney
6. John P. Hamilton
7. Henry George
8. Thomas Thompson
9. Joseph Sargent
10. Abram Huff
11. Peter George
12. Amos Beard
13. Mordica Hammond
14. Blueferd Hambleton
15. Don Alonzo Hamlin
16 John Elder
17. Joseph Slight
18. George W. Simkins
19. Miner T. Wickam
20. Nathan Frakes
21. Thomas Wingate
22. Wilson Vance
23. Joseph Johnson
24. Thomas Chester
25. William Wade
26. John C. Wickham
27. Josiah Elder
28. John Huff
29. Jesse Hewitt
30. John Long
31. Daniel Hamblin
32. Sampson Dildine
33. Asa M. Lake
34. Reuben W. Hamblin
35. George Swagart
36. John Jones
37. William Moreland, Jr.
38. John Taylor
39. John Fishel
40. James Beard
41. Godfrey Wolford
42. Edwin S. Jones
43. Selden Blodget
44. Job Chamberlin
45. John Gardiner
46. Robert Macully
47. Jacob Poe

48. Ebenezer Wilson
49. Charles D. Smith
50. Robert McKinnis
51. John Shoemaker
52. John Boid
53. Charles McKinnis
54. James Hendricks
55. Abel Tanner
56. Jacob Moreland
57. George Shaw
58. Asa Lake
59. William Grear
60. Squire Carlin
61. Simeon Ransbottom
62. Benjamin Chandler
63. John Tullis
64. James McKinnis
65. William Moreland
66. David Gitchel
67. John Simpson
68. John Travis
69. Joseph Dewitt
70. Philip McKinnis
71. Mathew Reighly
72. Joshua Hedges
73. Reuben Hale
74. Isaac Johnson

We do hereby certify that Reubin Hale had votes for Sheriff, 34, and Don Alonzo Hamlin for Sheriff 39.

John Boid for Coroner had 3 votes.

Isaac Johnson, 34 votes.

Thomas Slight, 37 votes.

Job Chamberlain had 31 votes for Commissioner.

Charles McKinnis had 35 votes.

Godfrey Wolford had 74 votes.

John P. Hambleton had 41 votes.

John Long had 39 votes.

Mathew Reighly had 59 votes for Auditor.

Joshua Hedges had 57 for Treasurer.

John Long had 35 votes for Assessor.

William Hackney had 39 votes.

ATTEST:

ABRAHAM HUFF,
WILSON VANCE,
MORDICA HAMMOND,
Judges of Election.

J. C. WICKHAM,
E. S. JONES, *Clerks.*

On examining the Poll book of the election for county officers, we do find that the following candidates were elected:

DON ALONZO HAMLIN, Sheriff.
THOMAS SLIGHT, Coroner.
GODFREY WOLFORD,
JOHN LONG,
JOHN P. HAMBLETON, Commissioners.
MATTHEW REIGHLY, Auditor.
JOSHUA HEDGES, Treasurer.
WILLIAM HACKNEY, Assessor.

Clerk and Justices present:

WILSON VANCE, Clerk pro tem.
JOSHUA HEDGES,
WILLIAM HACKNEY, Justices of the Peace.

The county was now fully organized and officered and prepared for governmental business. Doubtless the responsibilities of office sat lightly upon these early officials and interfered in but slight degree with their regular avocations. There were no public buildings in the county at that time, but the lack of them was not seriously felt. The people knew where to find their officials, and as the treasurer, who lived in the country, carried his tax duplicate around with him, it is said, he was always ready to receive moneys of the tax payers wherever he chanced to meet them. In this easy and happy manner did Hancock County—named after John Hancock of Revolutionary fame—embark on its long and prosperous voyage.

CHAPTER V.

TOPOGRAPHICAL.

Acreage of the County—Its Boundaries and Surface—The Soil—The River—Jean Jacques Blanchard—"Wild Cat Thicket"—Timber—Marshes—Sand Ridges—Crops—Springs—Benefit of the Limestone Formation—Under Drainage—Fish and Game.

Hancock County originally contained 368,640 acres of land, but upon the formation of Wyandot County in 1845, 28,000 acres were struck off of Hancock and became a part of the new county.

Hancock County is in the northwest part of Ohio, and in what is known as the Maumee Valley. It is bounded on the north by Wood County, on the east by Seneca and Wyandot, on the south by Hardin, and on the west by Putnam.

The surface is generally level, and much of it is appropriately called "flat land." The borders of the river and creeks are in many places broken, but in no place can they be said to be hilly. There is enough declination towards the water courses to make drainage easy and cheap, but there are no hills, no swamps, no lakes and no deserts, the entire county being adapted to agricultural purposes.

The soil is varied, mostly black loam, mixed with sand on a limestone base. It is in general highly fertile and susceptible of cultivation, being adapted to the production of almost any crop known in the temperate zone. It is just as productive of wheat as of corn, of grass as of vegetables. In most parts of the county it is deep and lasting, and does not require much assistance from fertilizers. The river and creek bottoms, though subject to occasional overflows, are especially productive, whilst the high lands yield scarce less bountiful crops.

Hancock County is watered by the Blanchard fork of the Auglaize River, which has its source in Hardin County, and enters this county in the southeastern part, at nearly the center of the south line of Delaware Township, running nearly north through that and Jackson and Amanda, and to near the center of Marion, when from that point it runs in a westerly course through Marion, Findlay, Liberty and Blanchard Townships, to the Putnam County line. By the Shawnees this river was called Sho-po-quo-to-kepe, or Tailor River, from the fact that Blanchard, after whom it was named, was by occupation a tailor. The river formerly furnished sufficient water power for running mills almost the entire year, but as the country has improved, lands became drained, creeks cleared of fallen timber and other obstructions, the supply of water is only sufficient for such purposes for a few months in the year.

Jean Jacques Blanchard, after whom the river was named, was French by nationality, "a tailor by trade, adventurer by disposition and non-communicative about himself from choice." He came from Louisiana in 1770, settled among the Shawnees, married a squaw, reared a family of seven children, and resided upon this stream long prior to the cession of the territory, which it forms, to the United States. He died in 1802, it is supposed on the site of old Fort Findlay. "He spoke Parisian French, is said to have had an intimate acquaintance with Greek and Latin, and had a liberal education. He was a man of all a Frenchman's culture and refinement, and the wonder is what he was doing out in the forsaken wilds of the Northwest Territory, married to a squaw, devoted to twelve little half-breed sons and daughters and plying his trade up and down the banks of the little river which soon became known as his especial property." He never gave any account of his wanderings, so the historians have accredited him to a Spanish pirate ship which he is supposed to have tired of. No one seems to know how he got to the point east of Dayton, where he first joined the Shawnees in 1770. It is known that he emigrated to Louisiana in 1760, and was there two years, but the seven years intervening is food for his building of historic theories. One theory is that he fled from his home in France for some offense. It is claimed that he was well skilled in carving and with his curiously wrought tools amused the Indians by his work in this art. He lived thirty years with his Shawnee wife, and when the Indians emigrated seven of his children were still living. In 1857 part of the tribe with which he identified himself moved to Iowa, Blanchard's son being chief of the division, and to this day there are Indians who trace their genealogy back to the point where Blanchard's sons appeared on the stage of Indian life.

In the north part of the county there is a tract of land ranging from one mile to two miles in width, and about ten miles in length from east to west, known as the "wild-cat thicket." It has its beginning in the western part of Portage Township, and crosses Allen and Cass, terminating in the western part of Washington Township. Prior to the settlement of that part of the county this tract of land was covered with a dense undergrowth, the larger timber having all been blown down by a hurricane, it is supposed, which passed over it, no one knows when. Indeed, from its then appearance, the entire body of timber, both large and small, must have been prostrated by the violence of no ordinary storm, and the present growth of timber dates since that period. Many of the older inhabitants well remember the look of desolation which was here presented—trunks of forest trees, decayed and decaying, an almost impenetrable thicket of bushes and wild vines, believed to be inhabited by wild cats, and other dangerous animals. Hence the name of "Wild Cat Thicket." The course of the storm must have been from west to east, as the trunks of the fallen trees lay in that direction, with their tops to the east.

The timber consists of the different varieties of the oak, and ash, walnut, poplar, beech, elm, maple—both hard and soft—buckeye, linn, hackberry, honey locust, wild cherry and mulberry. There was a very great quantity of walnut, ash and poplar, which woods are now most valuable, but which at the early settlement were of little or no value except for making rails for fencing. Now no timber grows but is of some value, oftentimes of more value than the land is after the timber has been removed. At the time of the first settlement of the county, it was an unbroken wilderness, densely covered with rank vegetation. A part of what is now Big Lick Township was a wet prairie, covered with a luxuriant growth of grass, but the ground was so wet and soft that it was almost impassable.

In Orange Township, there was quite an extensive cranberry marsh, which for years after the settlement of the county, was considered valueless for farming purposes. But as the country became settled, and farms were opened up on the borders of this marsh, making gradual encroachments upon it, the attention of the land owners in the vicinity was called to it, and since then, by a system of drainage under the supervision of the county officials, it has all been reclaimed, and is rich beyond measure.

A narrow sand ridge, upon which the Benton Ridge road is located runs southwest from Findlay through the village of Benton Ridge to the Putnam County line. Two sand ridges enter the northeast corner of the county and passing westward unite as one ridge on Section 5, Washington Township, thence runs in a southwesterly direction across Cass, Allen, Portage, and Pleasant Townships, where it is known as Sugar Ridge, because of the large number of sugar trees that once grew upon it. Fostoria, Van Buren and McComb are located on this ridge. Another of these narrow belts enters the northeast corner of Portage Township from Wood County and runs southwest, parallel with and about two miles north of Sugar Ridge. In the geological report of the state these ridges are called "The ancient beaches of Lake Erie."

"Limestone Ridge" is an elevated belt of sand and clay underlaid with limestone lying south of the prairie in Biglick Township. It was so named on account of the numerous flakes of limestone found scattered over its surface, probably the result of a great natural upheaval during the first stages of the earth's formation.

Wheat is one of the principal crops of Hancock County. Indian corn is produced in all parts of the county and has always been regarded as a standard crop. Oats of a good quality are produced in great quantities. Barley and rye are cultivated to some extent, but not being so readily marketed as wheat, less attention is paid to their raising. Buckwheat of course commands some attention from the farmer, as people could not very well do without their "Buckwheat cakes" for breakfast. Irish and sweet potatoes are easily cultivated, and yield most abundantly. Indeed all kinds of vegetables yield a most bountiful harvest. Fruits of almost all kinds can be found in all parts of the county, especially apples, which are the surest crop. Peaches, although a never failing crop in the early days of the county, may now be considered an almost entire failure. Small fruits are usually a good crop, but occasionally complete failures happen.

The county has but few springs, but water of a good quality may be obtained, in most places, by sinking wells from six feet to thirty feet in depth. The water, in consequence of the almost universal presence of limestone, is highly impregnated with lime, and is what is called "hard water." The river and creeks furnish an abundance of good limestone, used only, however, for making lime, of which article a very fine quality is produced, and used for building foundation and basement walls, not being of a quality suitable for other building purposes. In some parts of the county farmers meet with difficulty in tilling the soil, in consequence of the cropping out of the limestone formation. But the perfect adaptation of such lands to wheat raising, and the enormous crops produced fully compensate for the extra trouble.

Statistics in regard to the wealth and prosperity of the county, as a farming and stockraising locality, may be found elsewhere in this volume.

Formerly one of the worst drawbacks to the farmers in Hancock County as well as to those in other parts of northwestern Ohio, was the liability to damage by having too much rain drown out their crops. This has been almost entirely eliminated by the system of tiling or under-drainage. This was commenced by the most enterprising farmers about 1870 or 1875 and has grown in favor among the agriculturists from the beginning to the present. The lowest lying land of rich alluvial formation was almost useless until this plan was adopted, but since then it is considered as by far the most profitable land to own. Even the high ground is greatly benefited by the uniform system of tiling and now that all the farmers accept the situation and have tiled their land, it has placed them in a position of independence in regard to wet and dry seasons.

The river, formerly supplied the early settlers with an abundance of choice fish, but now by reason of the many obstructions placed in it in the shape of mill-dams, but few fish are caught, and they only of an inferior quality.

Wild game was also very abundant, but since the settlement of the county it has almost entirely disappeared.

CHAPTER VI.

PIONEER DAYS.

Early Records—Population—Settlements—Missionaries and Meeting-Houses—Camp-Meetings—First Sermon—Early Schools and Schoolmasters—The Country Shoemaker—Log Rolling—Shooting —Cornhusking—House-Raisings—Threshing—Quilting Bees—Racing and Other Sports—Stores and Taverns—Necessaries of Pioneer Existence—Description of Old Time Tavern—General Muster—Malaria and Milksickness—Taxable Property in 1824—Tax Levies—Findlay Selected as County Seat—The First Marriage—A Contested Election—County Printing—Road-Building—Administration of Estates—A Foul Murder—Simon Girty—Johnny Appleseeds—J. N. Free.

Owing to the fact that the early records of Hancock County were kept for the most part in small books, poorly made, or on scraps of paper, poorly preserved, much of our early history is lost beyond hope of recovery. Much that was recorded has, by the carelessness of those who had the records in charge, been mutilated to such an extent as to be almost unintelligible, and is thus unavailable for the purposes of the historian.

The population of the county in 1828 might be estimated from the vote polled in that year. As we have already seen, the first election held in the county after its separate organization, took place on the first Monday in April, 1828, at which election there were *seventy-four* votes cast. Now counting the population at five times the number of voters, we have three hundred and seventy as the entire population, which number is no doubt very nearly correct. At this date there were perhaps not more than a half dozen settlements in the county—one at Mt. Blanchard, one at Findlay, one at McKinnis, and one perhaps in the south part of the county, with one or two small communities elsewhere. Of course, there were a few families residing at various other points in the county, but they were regarded as a part of one or the other of these principal settlements, for all were neighbors then who lived within a day's journey of each other.

In 1830, when the Federal census was taken, there were eight hundred and thirteen persons in the county. Of that number four hundred and fifty-one were white males, and three hundred and fifty-one were white females, and there were three males and six females colored. Of the total number, only two hundred and fifty-two were above the age of twenty-one and one hundred and fifty-five males, and one hundred and forty-seven females, about three-fourths of the entire population were under the age of twenty.

In 1880, just fifty years after, the population of the county was twenty-seven thousand three hundred and forty-three. In 1900 it was 41,993.

The census of 1830 does not give the number of acres of improved lands, and value of buildings in the county.. We may, however, well conclude that but little had been done as yet towards subduing the wilderness, for even a hundred good stalwart pioneers could make but little headway against nature, which had been at work for centuries. Farms or clearings were therefore few and far between, and as to buildings, probably there was not a frame or brick building in the county outside of Findlay.

MISSIONARIES AND CHURCHES.

"Long before church buildings were erected, the missionary—ever mindful of the Master's work—came, and for the time being the rude cabin of the frontiersman, or the log schoolhouse, were the church edifices, in the advanced settlements. Here too, in these primitive buildings, were held the Sabbath Schools, the meetings of which were as anxiously looked for, and as highly enjoyed as are our more modern schools. Church services were frequently held in woods, under the cool shade of the forest trees, 'God's First Temples.' Such meetings were known as campmeetings, because those attending erected tents in which to reside during the continuance of the meeting. This style of meeting was then a necessity, as there were no buildings of sufficient capacity to hold the congregations, and not ministers enough to supply the different settlements with services, hence, they came together in large bodies, and had the advantage of the ministrations of a number of preachers.

"These meetings were conducted with the utmost decorum, with services at stated hours, and rules governing the little community in such a manner that all might enjoy their coming together. This style of service is not practiced to a great extent in this day, for there exists no such necessity as at that early date. With the abundance of houses of worship and ministers of the gospel, the holding of them meets with much disfavor by very many Christian men and women, as they are too generally visited by the wicked who wish to avail themselves of an opportunity of showing their innate cussedness."

The first church edifice erected in the county was the "Dukes' Meeting House," in Blanchard Township. It was built and owned by the Methodist Episcopal Church. The building was hewed of logs, and its dimensions were thirty-two feet long and twenty-eight feet wide. The roof was of clap-boards, a kind of roofing very much in use at that time, and were kept in their places by poles laid on each course of boards. The openings between the logs were chinked with wood, and daubed with mortar, the then prevailing style. The pulpit and seats were of rude construction. The seats were simply benches without backs, and the pulpit of unpainted boards. Many—very many—who in that early day met in that house for worship, have passed away. The pulpit in that old church has been occupied by such ministers as Bigelow, Finley, Thompson, Wilson, Gurley, Allen, Heustiss, Conway, Hill, Runnels, Breckenridge, Delany, Biggs and a host of other pioneer Methodists, whose names are familiar, not only in our own county, but all over Western Ohio. Humanity, civilization, good society, and all that goes to make us a great people, owe to these self-sacrificing, earnest, unselfish, devoted servants of their Master, a debt which can never be repaid, except by a practice of the precepts they taught, and in a defense of their memories.

As early as the year 1822, the Rev. James Gilruth, a Methodist minister, preached in Findlay. He had left his home in the east and came west for the purpose of entering lands. He first visited the land office at Bucyrus, Ohio, and there obtained a plat of Government lands not taken up in the District. He made his way into Hardin County, passing through old Ft. McArthur. But not being able to suit himself in that region, he turned towards Findlay. After leaving Ft. McArthur, he did not see a dwelling house until his arrival in Findlay, which was in the month of April. As soon as it became known that a preacher had arrived, he was waited upon by some of the citizens, and requested to preach for them. This he readily consented to do, and an appointment was made and circulated to the different settlements. Father Gilruth said he had a very attentive congregation, and as large a one as he could expect, and indeed it was said at the time, by those in attendance, that almost every man and woman in the county was present. This sermon was undoubtedly the first ever preached in the county.

It is stated, however, that the late Rev. Adam Poe, also of the Methodist Church, was led to suppose that he preached the first sermon in the county, owing to the following circumstance. He and another minister on their way from the Maumee River to the South, stopped at Findlay over night, and were solicited to preach. Poe consented to do so. They had put up at the tavern kept by Wilson Vance, had their horses cared for and ate their suppers, after which they went to the place of meeting, which was in a log schoolhouse near where the depot of the C. S. & C. "Big 4" Railroad is now located. The two missionaries had but a single dollar between them, and as it would require all of that to pay for their suppers and the care of their horses, and no one inviting them home with them, they slept in the schoolhouse that night, and the next morning, after paying their bill at the tavern, they rode to the next settlement, a distance of several miles, before getting breakfast. It is not at all strange, after such an experience, that Poe and his companion should conclude that they were the first to bring good tidings to this benighted people.

EARLY SCHOOLS AND SCHOOLMASTERS.

The history of education in Ohio is unique in this respect: That in 1785, before there was a settlement in the territory now comprised within the State, it was provided by Congress, in an ordinance for the survey and sale of the western lands, that section sixteen, or one-thirty-sixth of every township included under the ordinance, should be reserved from sale for the maintenance of public schools within the township. The "Compact of 1787" declared that "schools and the means of education shall forever be encouraged."

As these lands were at first only reserved from sale and settlement, no steps were taken by the territorial legislature to apply them to the purpose for which they were set aside. When Ohio was admitted as a State, these reserved school lands (of which there were 740,000 acres) were granted to the State and placed at the disposal of the Legislature.

The constitution of 1802, repeating the famous educational clause of the Ordinance of 1787, made it the duty of the Legislature to carry out its intent. It also provided that all schools, academies and colleges founded upon or supported by revenues from the land grants should be open "for the reception of scholars, students and teachers of every grade without any distinction or preference whatever." The Constitution of 1851 goes still farther, and declares in plain terms that the General Assembly shall provide by taxation or otherwise, "a thorough and efficient system of common schools throughout the State." What has the State done in fulfillment of these constitutional obligations which it assumed? Nearly all the school lands were sold long ago, and those that have not been sold are held under perpetual lease at an extremely low rental. The money received from the sale of these lands was paid into the State treasury, the State pledging itself to pay six per cent. interest thereon forever, the interest to be distributed annually among the various townships and districts for school purposes. As a matter of fact, the fund itself has been borrowed and spent by the State, and the annual interest the State is obligated to pay is raised by taxation. The fund is now, therefore, merely a fiction of bookkeeping, and represents the legal and moral obligation on the part of the people to tax themselves a certain amount each year for school purposes.

The old log schoolhouses, with their rude furniture, have been replaced by accommodations and facilities for securing an education that transcends the wildest dreams of the teachers and pupils of those primitive days. There are few people now left in the county who are old enough to recall these early "temples of learning," and a brief description will doubtless interest the pupils of the present as well as those of coming generations. The early schools were not public schools in any true sense of the word, and not free schools in any sense. Land grants were not yet available, and school taxes were unknown. The schoolhouses were not built by subscription; the neighbors would gather at some point previously agreed upon, and, with axe in hand, the work was soon done. These early structures all belonged to the log-cabin style of architecture. They were fifteen to eighteen feet in width, and twenty-four to twenty-eight feet long, with eaves about ten feet from the ground. The chinks between the logs were filled with clay mortar. The floor was of earth, puncheons, or smooth slabs. Puncheons were logs split and smoothed a little with an axe or hatchet on the flat side. To make a window, a log was cut out, usually the entire length of the building, and the opening thus made was covered with greased paper mounted on sticks.

The room, or at least one end of it, was heated from an immense fireplace, and it usually took most of the time of three boys to fill its hungry maw with logs. The furniture consisted principally of rude benches without backs, made by splitting logs in halves, and mounting them, flat side up on four stout wooden pins about fifteen inches long. Just under the window, two or three strong pins were driven into a log in a slanting direction; on these pins a long puncheon was fastened, which served as a writing desk for the whole school. There was no blackboard, and no apparatus of even the rudest description to assist the teacher in expounding the lesson. Steel pens were as yet unknown and their place was supplied by goose quills. Reading, spelling, writing and arithmetic constituted the course of study. Text-books were few. The favorite reader, when it could be procured, was the New Testament; Murray's reader was owned by a few, and here and there would be found a copy of the "Columbian Orator;" Webster's Speller was the first used, later, the "Elementary Speller" was introduced. They learned to "figure" from Pike's and Smiley's Arithmetics. When grammar was taught, which was not often, Murray's and Kirkham's grammars were the text-books used. These were the books comprising the primitive outfit of the teacher, while each pupil usually had one or more of them. As there was but little work to do on the farm in mid-winter, a three months' term was taught at that season, so that the boys could attend. The teachers were paid by subscription, and "boarded around," the terms being from one to three dollars per pupil for a term of three months. In those days there was little money with which to pay salaries, as nothing was raised to sell, and gold and bank notes were unknown before the War of 1812.

Probably none of these early teachers could measure up to the standards required of the teachers now in our schools; but, fortunately, the conditions of life in those pioneer days did not call for the educational qualifications that the boys and girls of the rising generation must have to hold their own in the battle of life.

After the completion of a rude edifice, the school directors hired perhaps the first man who came along and claimed that he was capable of teaching school. The younger class of rising Americans of that day, like their elders, took pride in the exercise of their muscular force in pugilistic encounters, and not infrequently there occurred a set-to between the teacher and the big boys when he attempted to punish them for infractions of the rules, in which the master generally came out best; for if he did not, he might as well have given up his position at once, for if worsted, from that time on there would be trouble brewing constantly; and in some schools it was necessary in hiring a teacher, to look well to his physical as well as to his intellectual qualifications, for without the former the latter were of little account.

"Readin and Ritin and Rithmetic were taught to the tune of a Hickory Stick," and it was considered a wise precaution on the part of those interested to look the master over well and size up his prowess on the first day of the term, so as to compute just how far it would be prudent to tempt him. During the holiday season it was the custom to expect a treat of apples or candy or both from the teacher to the entire school, and if he was negligent or refused to do so, he was barred out of the school room by the large boys, who secured an entrance to the premises by a key or through a window early in the morning, and by securely fastening the door on the inside, would not permit him to enter until the coveted treat was promised. In some instances this was carried on for several days in succession, the children returning each day to their homes for that day. At times the teacher arrived on the ground first and obtaining entrance first held the fort. But then the said "big boys," after fastening the door and windows on the outside would climb to the roof and by covering the chimney, would smoke the teacher into submission.

But taking it all in all when the teacher showed firmness with kindness, there was abundance of good feeling and a pleasant time was enjoyed.

In those days the country schoolmaster ranked next in importance to the circuit preacher, and as he went boarding around he was welcome to the best seat by the fire side, and the choicest viands at the table, and was regarded by the patrons of the school as the embodyment of wisdom, and by the younger members of the family as the embodyment of power, for well they remembered the birch rods sticking up in the walls of the old schoolhouse, and with what expertness he could wield them.

The first schoolhouse in Hancock County was built in Findlay, and the first school was taught by John C. Wickham, who was long a resident of the county.

THE COUNTRY SHOEMAKER.

In early days, owing to the absence of mercantile and manufacturing establishments made it extremely inconvenient, and at times almost impossible to obtain the necessary articles of clothing. A very large portion of the early settlers were engaged in agricultural pursuits, and hence mechanics and artisans were in demand, and the supply was of the less skillful class.

Thus the country shoemaker—and almost every settlement contained one—was a necessary appendage to a well regulated neighborhood. Each farmer or head of a family, would purchase leather enough, both sole and upper, to supply each member of his family with a pair of shoes—good heavy waterproof shoes—made for service, rather than for ornament. The shoemaker was then engaged to work up the stock. He had no shop furnished with counters, shelves and drawers, well stored with manufactured work, indeed it frequently happened that he had no abiding place, but like the country schoolmaster, boarded around. Going from house to house, he would take his seat by the side of the huge fire-place, and would measure, and cut, and shape, and thus make shoes enough for the whole family. His annual visits were looked for with interest by the little ones who, when he had come, would gather around him, watching with open-eyed wonder, the putting together with wax-end and peg, the homely but serviceable foot-gear. And how they enjoyed his story telling and songs. The coming of the shoemaker was one of the events not to be forgotten.

LOG ROLLING.

A log rolling was one of the great social events of early days and combined work with pleasure. The pioneer, after he had cut down the trees, and burnt the limbs or "brush" as it was called, cut them into certain lengths, and was then ready for "log rolling," to which all his neighbors were invited—an invitation that was never refused, unless for valid reasons. When the log rollers had assembled on the ground, they selected two or more of their number as captains, and by choice made by the captains would divide themselves into parties and apportion an equal amount of work to each party. The logs were then rolled into heaps and burned. The party who first cleared their portion of the ground, was declared winner and entitled to a first "smile" from the little brown jug, and a seat at the first table. A clearing with a score or more of men thus engaged in a friendly contest, was rather a lively place.

For the same occasion, the good wife would quietly put the patch-work quilt in the frames, and invite the wives and daughters of the log rollers to come in and help her. Thus, while the men and boys were busy in the fields, the women and girls were busy with the needles. After supper, whilst the girls were busy washing the dishes, and setting the house in order, the men found recreation in feats of running, wrestling and jumping. Candles, or the dry hickory bark torch were lit at dark, the country fiddler made his appearance, and taking his seat on a table, tuned up his instrument, when "choose your partners" was in order. The pioneer boys and girls danced to the music of such good old healthy tunes as the Fisher's Horn Pipe, Money Musk, Devil's Dream, Arkansaw Traveler and Colonel Johnson.

Whilst the young people were thus engaged, the older ones occupied themselves in smoking and rehearsing the exploits and gallantries of their younger days, occasionally joining in the dance, just to show the young folks how they used to do, you know. But to the still younger ones, the most interesting part of a log-rolling and quilting was the supper, for they were sure to get an extra piece of johnny cake, and a piece of pumpkin pie, after which they were generally willing to go to bed; but willing or unwilling, they went; as their room was much more desirable than their company, and they were tired out by the uncommon excitement of the day.

OTHER PIONEER AMUSEMENTS.

Every pioneer was of necessity a hunter, not for amusement alone, but for the reason that much of his subsistence, and his safety, and that of his property depended upon his skill and vigilance with the rifle. Hence it was, that almost every man and boy, and a great many women and girls were accomplished shots. Many a leisure hour did they while away in friendly competition with their trusty rifles, and proud was the champion of his laurels thus honorably won.

Among the most pleasant gatherings of these early settlers, were the corn huskings. Sometimes the corn was husked just as it had been cut and shocked in the field. At other times it was gathered in one place, either on a fine grass plot, or on the barn floor. It was usually divided into equal parts, and the husking party was divided into companies under captains. The company that first completed its task was declared the victor. When the huskings were held in the barn, the women and children would frequently assist.

These husking bees were usually held when the moon was at its full, so that there would be sufficient light. In the meanwhile the women-folk of the party were engaged in cooking and preparing supper for all, consisting of yellow corn cake, juicy venison, luscious turkey, and occasionally a slice or two of bear steak. Not unfrequently an entire crop of corn was husked in one night and without expense to the owner, other than furnishing the supper to the workmen.

Another source of pleasure, although mixed with hard work were house-raisings. In this, as in log rollings and corn huskings, the participants were divided into companies each under the lead of a captain. To each was assigned the raising of one side and of one end of the cabin. Each of these parties chose two of the most expert ax-men to carry up the corners, as the logs were raised to the proper place. A good deal of skill and a mechanical eye was required by these corner men, as a very slight mistake in making a notch too shallow or too deep or out of a straight line, might loose the whole corner. So expert became many of these men—and they were found in every settlement—that they were enabled to notch and place the logs almost as rapidly as they could be raised to their place on the building.

Grain was not thrashed by machinery driven by steam, as now, but was either beaten out by the old fashioned swingle or flail, or tramped out by horses or oxen. When thrashed it was separated from the chaff by a fanning-mill—consisting of two men and a linen sheet, the grain being slowly poured from a measure at an elevation, and passed in front of the mill, which was kept constantly in motion; the chaff was blown away, the clean grain falling to the floor.

The women also had their sport, for quilting bees were no less a source of pleasure and enjoyment to the wives. All the good dames in a neighborhood would assemble around the patchwork quilt and with stitch and gossip while away the time pleasantly, and around the well-ladened tea table exchange reminiscences of their girl-hood days.

Athletic sports had a great charm for these backwoodsmen. Running foot-races, jumping, wrestling, pitching quoits or horse shoes, lifting weights and like manly exercises best pleased them. Some of their feats of jumping and racing would do credit to a troup of modern athletes. And the ease with which they could "ring the meg" with a horse shoe at twenty-five or thirty yards was astonishing. With such exercises as these their muscles became hardened, their limbs were developed and their endurance put to the test.

Horse racing was also a favorite amusement with some. The swiftness of a race was not regarded as of much moment, but the simple fact that two horses would make a race no matter how slow it was, would be sufficient to draw a crowd and the pleasure in the amusement seemed to be just as keen as if they had been witnessing some of the feats of modern high-flyers.

Because of the isolated condition of the settlements and the almost unceasing toil of all, any social gathering was hailed with pleasure and enjoyed to the fullest extent.

STORES AND TAVERNS.

In the early days the mercantile business was no slight undertaking. Without any of our modern facilities for safe and rapid transportation, all goods had to be brought overland from points in the far distant East, principally Philadelphia, at great expense and risk, and it is not strange that we find that many a person who attempted the enterprise was compelled to abandon it after a loss. Naturally the stores were not of the specialized character that they possess, at least in the larger places, today, but contained commodities of every variety that could be used in the primitive settlements. The settlers depended, too, on providing themselves with many of the necessities for which we are now accustomed to look to our merchants.

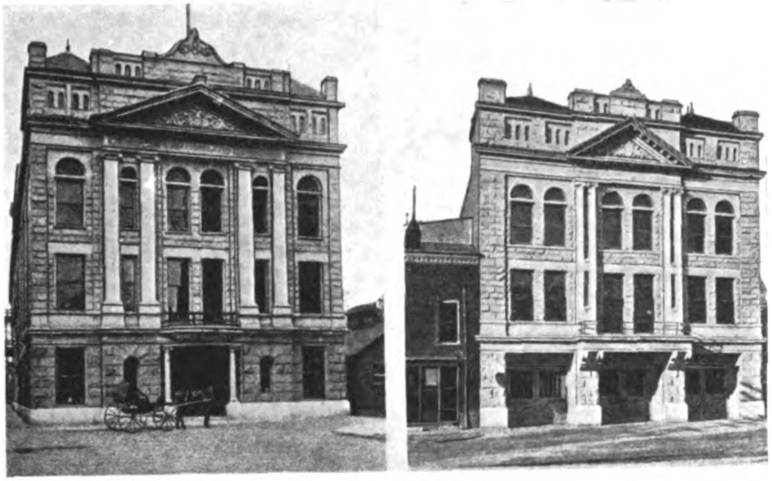
There were two commodities which, to most, are almost absolute essentials to existence and which the early settlers had the greatest difficulty in obtaining. These were flour and salt. In consequence we find among the earliest activities of the pioneer, an effort to provide a supply of these articles. Owing to the want of flouring mills in the county, flour and other bread stuffs had to be procured from distant and more favored settlements. Urbana, Perrysburg and Sandusky City were the principal points visited for this purpose. Salt was usually obtained through a process of evaporation by boiling the water from saline springs, a slow and tedious operation which raised the price of the product almost to that of a luxury. Then there were hats, shoes, crockery, hardware, medicines and groceries to be provided. For years money was very scarce, and all business became a system of barter, and goods were exchanged almost exclusively for produce. The trade with Indians was at one time large. They brought cranberries, maple sugar and syrup, pelts and furs, and bought only the finest goods. The women would take only the finest broadcloths for blankets and petticoats, while the men chose the brightest prints for shirts. The ordinary prints which now sell for 8 cents per yard sold then for $1.00, while the higher priced sold for $1.50 per yard. Every store had upon its counter a flask of whiskey with a glass and it was expected that every one who came into the store would avail himself or herself of the hospitality thus set forth. Tobacco was in large demand among the Indians, who made a mixture of tobacco and sumac leaves, calling it 'Kinnikinic.' "

In the early days there was no institution of greater importance, perhaps, than the tavern. The most prominent and influential citizens did not hesitate to engage in the business, and the number of taverns in existence at that time in any locality would now, perhaps, be considered out of proportion to the size of the place. It was a sort of center for all the various activities of the neighborhood. Here the people gathered to exchange their gossip as well as to hear news of the outside world from any chance stranger that happened along. Here all the public gatherings were arranged, all the notices were posted, and court was held here, in some localities. It was an institution of great importance, just as it is in later times, though in lesser degree, under another name. It was not long after the county began to be settled until we find these hostelries being established in various parts of the county as the need for them arose. The following description of one of these old taverns, though applying to a neighboring county, will answer equally well for the type that prevailed in early days in Hancock County.

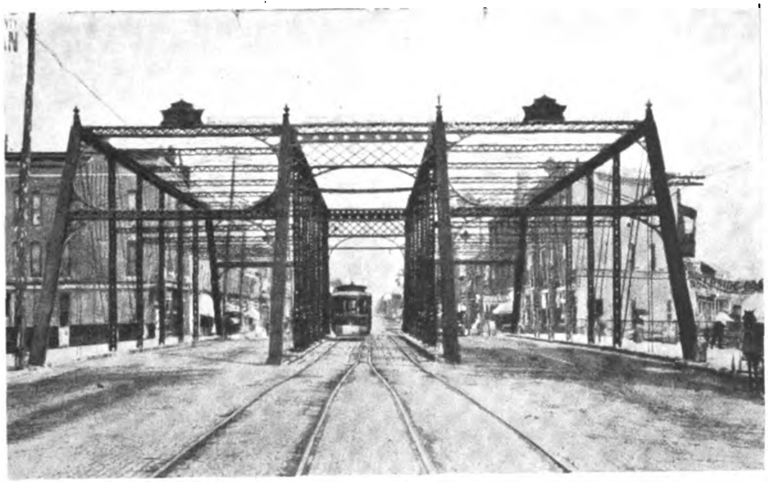
"The Pioneer Tavern was a few rods southeast of the 'Medicine Water.' It was on the plateau just east of the ridge that lies south of the spring, and terminated near there, some three or four rods onward from the present street. The first house was a double roomed one, with a loft, standing north and south, facing the east, and was built of round logs, 'chinked and daubed.' In course of time, a second house, two stories high, was added, built of hewed logs, and placed east and west, at right angles with the south end of the first building, with a little space between them. In this space was the well with its curb, and its tall, old-fashioned, but easy-working 'well-sweep.' Around at the southwest of this was the log barn and the blacksmith shop, and a double granary or corn-crib, with a space between for its many purposes, as necessary, indeed, as the kitchen is for household purposes. Here was the grind-stone, the shaving-horse, the hewing block, the tools of all kinds and the pegs for hanging up traps of all sorts. Here the hog was scalded and dressed, the deer, raccoon and 'possum were skinned, and their skins stretched and dried, or tanned. Here also were the nuts cracked and dried. For many reasons it has a bright place in the memories of boyhood. How few know the importance of the pioneer tavern in early days. It was, of course, the place of rest for the weary traveler, whether on foot or on horse. It was many a day before a 'dearborn' or a 'dandy-wagon' was known on the road. But it was much more than this and seemed the emporium of everything. It was the market place for all; the hunter with his venison and turkeys; the trapper with his skins and furs; and the knapsack peddler—the pioneer merchant—here gladdened the hearts of all with his 'boughten' wares. At this tavern, too, were all public gatherings called, to arrange for a general hunt, to deal out justice to some transgressor of the unwritten but well known pioneer laws. In fact it was here, at a later period, that the first organized county court was held, with the grand jury in the tavern loft and the petit jury under a neighboring shade tree."

GENERAL MUSTER.

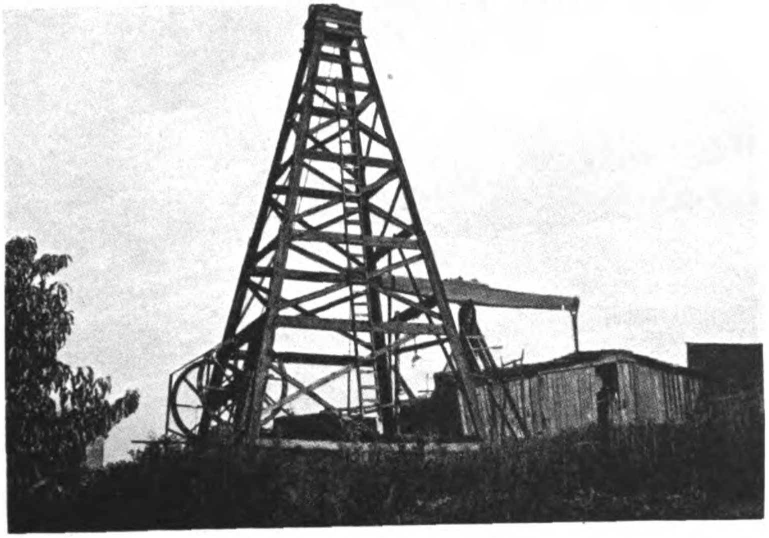
One of the most important events in pioneer days was the General Muster, it being especially interesting to the younger portion of the population. For months before the annual parade the soldiers were busy in repairing and polishing up their old flint-lock muskets, while the officers were studying up their words of command, and brushing up their regimentals. The farmer, who always had an eye to business on such occasions, was carefully cultivating his melons, and vigilantly watching to protect them from thieves. The thrifty house wife was gathering up the eggs and laying by the butter, for she intends going to town on training day, and with the proceeds of her produce, to buy a little tea for her next quilting, and an extra bit of muslin for a new cap. The grown up girls were busy making dresses, for their beaux had been over and invited them to go to town on muster day, and had offered them a seat on the horse behind them, and the small boys were trying to earn and save all the pennies they could, expecting to invest their savings in ginger-bread and candy. When the long looked for day came, almost the entire population of the county might have been found assembled at the county-seat, the place of general rendezvous. Officers in blue coats, brass buttons, red sashes, monstrous epaulets, and broad swords, mounted on the stately plow horse, cavorting up and down the street, the terror of anxious mothers, in danger themselves of broken necks, and to the admiration of small boys. George Washington in all his glory was never arrayed like one of these militia officers, and we doubt if he ever felt half so important. The men by companies, some armed with rifles, but more with sticks and mullein stalks, marched and counter



MUNICIPAL BUILDING. CENTRAL FIRE DEPARTMENT HEADQUARTERS, FINDLAY



MAIN STREET BRIDGE, FINDLAY



OIL WELL IN OPERATION NEAR FINDLAY

THE PHOENIX INN, FINDLAY

marched, and performed evolutions not now laid down in the regulations. They were formed into lines, into circles, into hollow-squares—a great deal more hollow than square. There were the Findlay Rangers under the command of Capt. Lape, arrayed in Aaron Baker's uniform. The rangers were dressed in uniforms of green, profusely trimmed with yellow tape. There were the Van Buren Rangers commanded by Col. Wall, with uniforms of green, trimmed with red, marching to the music of fife and drums. There were other companies, clothed every man accordingly to his taste, or comfort, or ability. But the "Light Horse Company," commanded by Capt. John Byal, was to the boys the very acme of military glory. To see the men mount and dismount, and face and right face, was truly wonderful. True, the evolution was not performed as rapidly and as gracefully as Phil Sheridan's cavalry might have done it, but then what did he know about cavalry mustering on farm horses?

"Under the direction of Gen. Bell, Col. Byal and other field and staff officers, the companies were put through their facings until noon, when they were dismissed for dinner. After dinner the fun commenced, in the shape of running, jumping, wrestling, pitching horse-shoes, drinking and fighting. The few groceries in the town were places of lively interest, and a good gingerbread and small beer business was done.

"Each company had its fighting man, a much more economical and comfortable plan than keeping up a whole fighting company, and he was expected to whip any and every man who dared offer an indignity to the company or any member thereof; and it was a very dull day, indeed, if there were not as many fights as there were companies on parade. After these amusements, and the wounded had been properly cared for, those who were not disabled in the engagement, and could walk, were marched to the green on the river bank—now the circus ground—for 'Grand Review,' or dress parade. Here they were inspected by the General in command who sat on his horse, 'grand, gloomy and peculiar,' under the shade of his umbrella, whilst the heated warriors marched solemnly and silently by. Tired, foot-sore, and hungry, they were discharged until the next mustering day. These veterans can now well quote the stanza:

'Oh, were you ne'er a militia man,
  And did you never train?
And feel that swelling of the feet
  We hope to never feel again.'"

MALARIA AND MILKSICKNESS.

The great prevalence of malaria in pioneer days is supposed to have been caused by the felling of the heavy forests and the consequent opening up of the rich damp soil to the rays of the sun. As this transformation progressed, the disease became common and severe to an extent that was disastrous to the inhabitants, and scarcely a soul escaped its visitation. Commencing with the month of July or August of each year, and especially in wet seasons came an epidemic of ague or as a majority of the people called it "agy." Popularly the disease was known as "fever and ague," "chill fever," the "shakes," etc. In the majority of cases the attack was sudden, the victim feeling no premonitary symptoms previous to the chill. In some cases, however, there were premonitions for a variable period, consisting of pain in the head, yawning, indisposition to exertion, loss of appetite and general malaria. These symptoms were followed by the usual cold, hot, and sweating stages of the disease. At first the victim might do much labor between the daily attacks, but after its continuance for a week or more they became sallow and weak and unable to perform manual labor. In some cases the attack came on every second or third day instead of every day. The disease was a drawback to the early settlers, but as the country became cleared and drained it gradually disappeared. It was not directly fatal in any case.

A more serious disorder, which was disastrous and fatal to both man and beast, and which sometimes prevailed to an alarming extent in the early settlement and more or less up to the 80's but which is now believed to be almost or entirely extinct is what was known as "Milksickness," "Trembles," "Sick Stomach," "Slows," etc., names signifying some prominent condition or symptom of the disease. This disease prevailed over most of the country between the Allegheny and Rocky Mountains, but was especially virulent in northwestern Ohio.

It affected primarily cattle, (horses, sheep and goats being also affected), and from them it was communicated to human being through the medium of their flesh as meat or the milk of the cow. The cows themselves would convey the disease to their calves or to human beings. The cattle would take the disease while pasturing on deadnings, clearings, or new unbroken soil, and while many causes were assigned for the malady, the most common was that the animals had eaten some plants or shrub growing in uncultivated grounds, for they were not subject to it when on pasturing ground that had been well tilled. The most suspected weed was the Eupatorium ageratoides, or white snake root, a many-branched, flowering plant that gave a whitening decoration to our woodland pastures in the autumn season, the time of year when the disease prevailed. Animals attacked stood mostly in one place or moped around in a feeble manner, and if forced to exercise, would tremble violently. The appetite was gone and often their bodies would be agitated and shake like that of a person in an ague fit. After a few days they would drop over and suddenly die.

In man the symptoms were persistant vomiting, and retching, with great distress in the stomach, and restlessness. The prostration increasing, delirium came on and soon coma and death ended the scene.

MISCELLANEOUS.

The proceedings of the County Commissioners on the 1st day of June, 1829, show the following entry:

"Don Alonzo Hamlin made his return of assessment of chattel property, and land property subject to taxation in Hancock County, which was examined and accepted, and the said assessor presented his account for his labor in assessing the property of the county, which was accepted, and which was nineteen dollars and seventy-five cents."

There was but one Assessor in the county, and his duty appears to have been to value both real and personal property. In December of the same year we find this entry: "The Auditor presented his account and was qualified to the same, ordered that the said Auditor be allowed twelve dollars and twenty-five cents for his services, and that said Auditor be paid the sum of ten dollars for extra services up to and including this day."

LIST OF ALL THE TAXABLE PROPERTY IN THE TOWNSHIP OF FINDLAY FOR 1824.

PROPRIETORS NAMES	Horses above 3 yrs. old	Neat cattle above 3 yrs. ld
L. Asa Lake	2	11
M. Charles McKinnis	2	4
M. Henry McWhorter	2	10
P. James Patterson	0	7
P. Jacob Poe	1	5
W. Joseph White		2
H. John P. Hamilton	2	2
G. John Gardner	2	4
H. John Hunter	1	8
C. Job Chamberlin		5
S. John Simpson	2	1
G. John Gardner, Jr.	1	3
M. Jacob Moreland		4
B. Michael Beck, taken in from lady	2	2
M. Philip McKinnis	1	6
T. Thomas Thompson, taken in from lady	1	5
M. William Moreland	1	3
S. Thomas Slight	1	4
V. Wilson Vance	1	4
C. Elnathan Cory, given in by Wilson Vance		15

I certify the above to be a correct list.

WILSON VANCE,
Lister of Findlay Township,
Wood County, Ohio.

Endorsed Taxable Property, Findlay Township, 1824.

The amount of tax on each animal was fixed by the Auditor, the tax being a specified sum on each, and not a per cent, as at the present day. No animals under three years of age were taxable. The township of Findlay, it will be recollected, embraced the whole county, at this date. In 1826, the records of Wood County—to which we were then attached, comprising one township show that the tax in this county was $56.17.

In 1829, the earliest tax list is found, after the independent organization of the county, the value of the taxable property of the county, as returned, was $16,601.00, and included in the then townships of Findlay, Delaware and Amanda, the only organized townships in the county, and the assessment included both real and personal property. The tax assessed upon the valuation was $172.44.

In 1829, there were 4,775 acres of land subject to taxation in the county, and this was valued at $8,186, not more than an average farm is now worth, or a little over two dollars an acre. Of this taxable land, 2,969 acres were in Findlay; 1,374 in Delaware, and 252 in Amanda Township. Our Amanda Township friends will perhaps be mortified to know that their lands were valued much lower than were the lands in the other townships, and yet it was no doubt some consolation to know that they paid but $4.30 tax on land.

In 1829 there was returned by the Assessor ninety-three horses, valued at $3,720.00, and 279 cattle, valued at $3,116.00. From these few illustrations, we may see from what small beginnings the early settlers began life in this new country.

In the year 1830, the salary of the County Assessor was fixed at $23.37½, and that of the Auditor at $40.00.

On the 3d day of April, 1834, William L. Henderson was appointed appraiser of real estate for Hancock County.

The tax levy for 1829 for county purposes, was seven and one-half mills on the dollar. For 1830, it was seven mills. For 1831, it was seven mills. For 1832, it was five mills. In 1833, for county purposes, seven and one-quarter mills, and for road purposes, two mills.

At a session of the Court of Common Pleas, in and for the county of Wood, Hancock being then a part of said county—the court being held at Maumee, in 1820. "Wilson Vance was appointed Surveyor of Wood County."

At a session of the same court, held in May, 1822, "Wilson Vance was licensed to keep a tavern in Findlay for one year. The court fixed the price of five dollars per annum."

At the October term, 1824, of said court, the following entry was made on the court records: "The Commissioners appointed to establish the seat of justice in the County of Hancock, in the State of Ohio, report that they have selected the town of Findlay, in said County of Hancock, as the most suitable site for the seat of justice of said county, as per their report on file, in the office of the Clerk of this Court."

This Commission was appointed under the provisions of the Act of the General Assembly, as follows:

"*Resolved,* By the General Assembly of the State of Ohio, that John Owens, of the County of Champaign; Alexander Long, of the County of Logan; Forest Meeker, of the County of Delaware, be and they are hereby appointed Commissioners, to locate and fix the seat of justice, in and for the County of Hancock, February 2d, 1824."

The following record is found under the date of January, 1825: "Findlay, January 11, 1825. This is to certify, that on the second day of September, in the year 1824, Samuel Kepler, of Williams County, and Rachel McKinnis, of Hancock County, were legally joined in marriage by me, a Justice of the Peace, in and for the County of Hancock, and Township of Findlay. Given under my hand,

"WILSON VANCE, J. P."

This was, undoubtedly, the first marriage in the county. At all events, it is the first of record in both Hancock and Wood Counties. Other early marriages were:

September 14th, 1826, Asa M. Lake and Charlotte Greer, by Joshua Hedges, J. P.

March 12, 1827, William Moreland and Julia Chamberlain, by Joshua Hedges, J. P.

August 24th, 1827, Sampson Dildine and Sarah Highland, by Joshua Hedges, J. P.

November 1, 1827, John Gardner and Susan Moreland, by William Hackney, J. P.

December 20, 1827, Philip McKinnis and Susan Dukes, by Joshua Hedges, J. P.

On the 4th day of June, 1832, Thomas F. Johnson, auditor, resigned, and the commissioners appointed Joseph C. Shannon to fill the vacancy. Johnston, late auditor, was allowed forty dollars for extra services."

The commissioners at their December session, in 1834, appointed Parlee Carlin, Recorder of Hancock County, until the next annual election in October. The records are silent as to the cause that made it necessary to appoint a Recorder.

The first case of contested elections, of which we have notice, is the records of the county, is indicated in the following notice, which seems to have been served on the Clerk of the Court:

"To the Clerk of Hancock County. You are requested to withhold the returns of the election of Union Township, wherein Wenmem Wade was elected Justice of the Peace, and the election is contested, and said contest is to be tried on the 13th of September, 1838.

WM. ROLLER,
Associate Judge."

The commissioners of Wood County, at their session in December, 1820, ordered that the "road from Ft. Meigs, or the foot of the rapids of the Maumee of the Lake, to Bellefontaine, be opened." And at their session March 4, 1822, this order was made: "Ordered by the board that the Township of Waynesfield, within the jurisdiction of the County of Wood, be co-extensive with the boundaries of Wood and Hancock and to include the same."

June 6, 1826, the commissioners of Wood County, "Ordered that four hundred dollars of the road fund be appropriated to Hancock County, to be expended on the Urbana road, in said county."

The first order for printing, so far as the records show, was made at the December session, 1836, of the commissioners, and read thus: "Ordered that Jacob Rosenberg print sixteen hundred county orders, for sixteen dollars, in Hancock County orders, to be issued when the orders are struck."

It appearing that no record of land entries in the county had been kept in any of the county offices, and the county commissioners believing such a record necessary, we find in their proceedings, in 1839, this entry: "It was ordered that some suitable person go to each of the land offices in this Land Office District, and procure a duplicate of all land entered in the county up to this date, with the names of the original enterers, the date of entry, the description, quantity, township and range, was ordered to be set up to the lowest bidder at a public outcry. Whereupon, the same being cried in the presence of the commissioners, it was cried off to Jacob Rosenberg, he being the lowest bidder, for the sum of thirty-nine dollars."

We find another order for county printing, this time, June 7, 1842, and in this, as in the former one, the commissioners fix the price. It was "ordered that the auditor of Hancock County, have the receipts and expenditures of said county, published in the Courier, providing he can get it done at the rate of 87½ cents per square, in a condensed form; if not, have it posted up as the law provides."

About this time we have a recorded specimen of how easy, and how quickly, an officer may resign, when he makes up his mind to do so. "To Aquilla Gilbert, George Shaw and Andrew Ricketts, Commissioners of Hancock County. Gentlemen: I hereby resign to you my office of Auditor of Hancock County, Ohio. you will, therefore now consider said office vacant from this moment.

"Yours with respect,
"W. L. HENDERSON."

As soon as the commissioners could recover from their sudden surprise, and comprehend the full meaning of the letter, they proceeded at once not only to accept the resignation so suddenly thrust upon them, but also to fill the vacancy, which they did by appointing James H. Barr until the first day of March next ensuing.

The commissioners, on the third day of March, 1846, authorized Fred Henderson to procure a suitable bell for the court house, the original cost of which should not exceed $250 and have the same placed in the cupola of the court house.

In July, 1830, the commissioners "Ordered the sale of cutting out the road—Bellefontaine to Perrysburg, and Findlay to Defiance—thirty-two feet wide. All timber twenty inches in circumference to be cut out, and the ground to be cleared of all timber."

ADMINISTRATION OF ESTATES.

Under the old judicial system of the State, administrators of the estates of the deceased persons were appointed by the associate judges of the county, and upon the decease of an individual seized of an estate, it was necessary to call a special session of the court, in order to appoint an administrator. This was certainly very inconvenient, and at this day would be very expensive.

The first record we find of such a session of court in this county, was one held on the 19th day of March, 1829, at Findlay, by Judges Huff, McKinnis and Wilson. At that time, William Taylor was appointed administrator of the estate of Hon. John Patterson, deceased. His sureties were Job Chamberlain, Sr., and John Boyd. The whole amount of money coming to the hands of the administrator from the sale of both real and personal property, was $869.50, quite an estate for that early day, and Mr. Patterson was regarded as one of the wealthy men of the county. The administrator was allowed a credit of two dollars, for two days' services as administrator. This was certainly a novel way of getting pay for such services, to say nothing of the very moderate charge made. The attorneys, for procuring the sale of the land, and advising in the settlement of the estate, were allowed five dollars.

The first will recorded was probated in March, 1830, and the introduction read as follows:

"In the name of God, Amen. I * * * of Hancock County, State of Ohio, being sick and weak in body, but of sound mind, memory and understanding (praised be God for it), and considering the certainty of death, and the uncertainty of the time thereof, and to the end I may be better prepared to leave this world whenever it may please God to call me home, do therefore make and declare this my last will and testament in manner following, (that is to say) first and principally I commend my soul into the hands of Almighty God, my Creator, praying for free pardon, and remission of all my sins, and to enjoy everlasting happiness in the Heavenly Kingdom through Jesus Christ, my Savior. My body I commit to the earth, at the discretion of my executor hereafter named."

Then follows the several items of the will all as properly, and at the same time as specifically expressed, as is the foregoing. Indeed, in looking over the records of the wills of that day, we are impressed with the certainty of the language of every bequest. No ambiguity, no looseness of expression on which a law suit might hinge, no possible chance for litigation and fat fees. No wasting of the estate in determining the intentions of the party, but everything plain and to the point.

A FOUL MURDER.

A Wyandot Chief, known as Sum-un-du-wat—a Christian Indian, brave, generous and kind—honored by his tribe, and respected by the whites for his honesty and bravery, was most foully murdered, with his daughter and her husband, near Napoleon, in Henry County. The event created a most profound sensation, and for some time there seemed to be danger of an outbreak amongst the Indians.

The assassins were John Anderson and James Lyons, who lived near Portage, Wood County. Anderson had tried to buy or trade for a favorite dog of the Indians, but without success. He made the declaration that he would have the dog before another week had passed. He and Lyons followed the Indians to near Napoleon, where by the direction of one John Ellsworth, who resided about six miles west of Portage, they committed the bloody murder. They got all the money of which Sum-un-du-wat was possessed, which Snake-bone and other chiefs, declared was about six hundred dollars; also, seven ponies, a lot of furs and dogs. They returned to the house of Lyons, a little west of Portage, where they concealed the ponies and all of the dogs, except the favorite one, which Anderson appropriated as his own, and although the dog was seen in his company, no one suspected that he had obtained it by other than fair means. In the excitement after the murder, one of the ponies escaped and wandered to the camp of Snake-bone and his party. On being followed it returned to the place where the murdered Indians lay. The alarm was given, and Snake-bone and his party followed the trail to Portage, where they found and arrested Anderson and Lyons. The former was at church in the village. The Indians surrounded the building and captured him as he came out. The prisoners were conducted to Napoleon, where a preliminary examination was had, and the parties were committed to jail, but afterwards made their escape, and were never punished. At the trial Anderson turned States evidence, and related the story of the murder. He stated that they stayed with the party three days before they met with a favorable opportunity to commit the hellish deed. When the Indians arrested Lyons, they found all the dogs belonging to them, under the floor of Lyons' house. The "boys" said that Ellsworth induced them to commit the murder, and after it was done, advised them to let him have the money until the excitement should pass over, and then they would divide. But the old scoundrel took the money and fled the country.

Sum-un-du-wat was about sixty years of age. Snake-bone in his endeavors to find the murderers, was three days and nights on the trail, and such were his exertions, that he broke down from their effects, and died shortly after. This murder was but another exhibition of that devilish disposition, possessed by some, to cruelly treat the weak and unprotected, shielding themselves behind a general feeling of hostility towards a particular race. No one could truthfully point to a single act of cruelty or hostility by Sum-un-du-wat towards any white man, on the contrary, he had been the friend of the whites, and had rendered them many valuable services.

SIMON GIRTY.

One of the most notorious characters of early days in the Northwest, including Hancock County, was the white renegade, Simon Girty. He was born in northwestern Pennsylvania of an intemperate father and an unworthy mother. Simon had three brothers—Thomas, George, and James. Simon, George and James were taken prisoners by the Indians during the French and Indian War, when Simon was about eight years old, Simon was adopted by the "Senecas" and given the name of "Patepacomen." He was one of the white captives surrendered to Colonel Bouquet in

1764, but soon after escaped and returned to savage life. In 1774 he took part in Lord Dunmore's War on the side of the Virginians. Here he met Simon Kenton and the two young men soon became fast friends. He also became intimately acquainted with Colonel Crawford and was frequently a guest at his hospitable cabin.

Girty aspired to a captaincy in the regular army in 1778 but, failing in this, deserted Fort Pitt in company with fourteen others. He immediately inaugerated a reign of terror among the frontier settlers. He represented to the friendly Delawares that the white people intended killing every Indian they met; that Washington was killed and the Revolutionary Army cut to pieces; that there was no Congress, the British having hung some members and taken the rest to England. The Delawares disbelieved his story and he moved on westward to the Shawanees on the Scioto, to whom the Delaware chiefs sent word not to believe what he told them.

Girty now started for Detroit. On his way he was captured by the Wyandots. The Senecas who recognized him, demanded that he be given up to them because, having been their adopted son, he had now taken up arms against them. But Leatherlips, the Wyandot chief, ignored their claim to him. The Wyandots finally set him at liberty and he proceeded to Detroit, where Gen. Hamilton, the British commander, gave him a cordial welcome. He was now given work that suited his nature exactly. He was employed at sixteen York shillings a day and sent back to Upper Sandusky to incite and assist the Indians in their border warfare. He soon became a leader among the Wyandots and Shawanees along the head-waters of the Scioto and Sandusky rivers, in their murderous forays into the border settlement. From Pittsburg to Louisville his name carried terror all along the Ohio. Doubtless he led many a helpless victim of the frontier captive along the trails through Hancock County or danced with his dusky companions around the helpless victim burning at the stake. He was present at St. Clair's defeat in 1791 and at the battle of the Fallen Timbers in 1794. After the Treaty of Greenville, he engaged in the Indian trade at Lower Sandusky and later at "Girty's Town" on the site of St. Mary's in Mercer (now Auglaize) County. He then removed to Malden, Canada, where he settled on a farm on the Detroit River where he died in 1818, aged 70 years. For several years before his death he was nearly blind and a complete wreck.

"The last time I saw Girty," wrote William Walker, "was in the summer of 1813. From my recollection of his person he was in height five feet six or seven inches; broad across the chest; strong around; compact limbs, and of fair complexion. To any one scrutinizing him, the conclusion would forcibly impress the observer that Girty was endowed by Nature with great powers of endurance." Spencer, a prisoner among the Indians, gives this vivid description of him: "His dark shaggy hair; his low forehead; his short flat nose; his brows contracted and meeting above his short flat nose; his gray sunken eyes averting the ingenuous gaze; his lips thin and compressed; and that dark and sinister expression of his countenance

—to me seemed the very picture of a villain."

JOHNNY APPLESEEDS.

This eccentric individual, whose real name was John (or as some say, Jonathan) Chapman, was one of the well known characters in early days. He was a Swedenborgian, acting as a kind of missionary amongst the Indians, and in his perambulations through the wilderness planted the seeds of the different kinds of fruits, so that in many places in the county, there were fruit trees in great numbers and some of them already producing fruit, at its first settlement. He was supposed to be a native of Massachusetts and was regarded as an intelligent, harmless, but slightly demented man! At all times sociable, and full of pleasant story and good advice, after his fashion, he was always made welcome by the pioneers. His personal appearance was as singular as his character. He was a small chubbed man, quick and restless in his motions and conversation. He wore his hair and beard long and had a sparkling black eye. He lived the roughest life and often slept in the woods. He went barefooted, and often travelled miles through the snow in that way. Wherever he went he circulated Swedenborgian works. He was careful not to injure any animal, and thought hunting morally wrong.

During the coldest weather he refused to wear shoes and upon one occasion, when forced to accept a pair from a kind hearted farmer, he came to Mansfield, which was then but a small village and gave them to a poor family who were going west. When he first came to Ohio he accepted the cast-off clothing of the settlers, but afterwards became convinced he was getting too proud and worldly and finally he adopted the coffee-sack suit, in which he died. His head was protected from Old Sol's smiles, by a tin pan, which was also used as a culinary utensil, when he was overtaken by hunger in the woods. He believed it a sin to tread upon a worm, or eat flesh of any kind during lent.

He was first seen in Ohio in 1801, and with him an old blind horse, drawing in an aged and infirm wagon a quantity of appleseeds. These seeds he planted in Eastern Ohio along the banks of rivers and creeks. Returning to Pennsylvania, Johnny disposed of his steed and equipments and gathering up several bushels of seeds at the cider presses in Western Pennsylvania he started for Ohio with them on his back. For years he kept on in the even tenor of his ways, starting orchards all over this part of the state, but when emigrants from other states began to pour in and take up the land in Ohio, poor Johnny found his occupation gone, and taking up his coffee sack moved into Indiana, where he continued to plant appleseeds for some time, until death overtook him, and he was laid away in a country churchyard a few miles from Ft. Wayne.

The following incidents are related as illustrating his eccentricities, as well as his kindness of heart. One cool autumnal night whilst lying by his camp-fire in the woods he observed that the mosquitoes flew into the blaze and were burnt. Johnny thereupon brought water and quenched the fire afterwards saying, "God forbid that I should build a fire for my comfort that should be the means of destroying any of his creatures."

At another time he made his camp-fire at the end of a hollow log in which he intended to pass the night, but finding it occupied by a bear and her cubs he removed his fire to the other end and slept in the snow, in the open air rather than to disturb the bear.

An itinerant preacher was once holding forth on the public square in Mansfield and exclaimed, "Where is the barefooted Christian travelling to heaven?" Johnny who was lying on his back on some timber, taking the question in its literal sense, raised his bare feet in the air and shouted: "Here he is!"

JACOB NEWMAN FREE.

A very interesting eccentric character who often visited Hancock County and especially Findlay, commencing in the late fifties and down to 1906 was J. N. Free, or as he called himself, "The Immortal J. N." or "Philosopher."

He was born at Chambersburg, Pa., June 19th, 1828, of German parents, his father the Rev. Dr. John W. Free, and his mother, Mary Newman Free, being a cousin to the author of "Lead Kindly Light." The entire family of eight children lived to manhood and womanhood. Seven of them taught school. Mayor John W. Free and Henry N. Free were lawyers of Lexington, Ky., and Col. William Free was a merchant of the same city. The family moved from Pennsylvania and lived several years in Mansfield, Ohio, but later moved to McKutchinsville on a farm of 135 acres about a mile south of the village.

Jacob N. was a precocious child and his father crowded him with learning so that he was able to read and write in several different languages when he was nine years old, and graduated when quite young from the Meadville College, Penn. He was a tall, powerfully built man with long hair and a heavy moustache, high prominent cheek bones and a restless maniacal eye that seemed to fairly penetrate the object of his stare. His clothing was shabby and his hair unkept and he had the mien of a restless apprehensive man, rarely remaining long in one place; his voice was powerful, and he spoke in a style of command, short and positive. His memory, wit and sarcasm knew no bounds and woe to the man upon whom he turned these sharp tools; he fairly picked him up and spit him out, and people who had once been the subject of his ability in that line gave him a wide bearth!

Once or twice a year he would send word in advance that he would be in Findlay on a certain night and would lecture at the old courthouse; his subject, that he would "Lift the veil and disseminate the truth." Sometimes he came and sometimes not. If he appeared he would wait on the outside until the audience were seated and there were generally plenty of seats and to spare —when he would enter the house, walk up the aisle in a dignified manner, ascend the platform, reach in his pockets and pull out a couple of Colt revolvers and a couple of pairs of handcuffs and, after slamming them down on the desk before him with some violence, and some offhand remarks about them, would then commence his desultory and incoherent address.

After the war a favorite theme of his was, "The North thought the South was wrong and the South thought the North was wrong. Both were wrong; both were right."

He would wait until the next day to see what the local papers said of his speech the previous evening and seemed to enjoy a severe roasting with more relish than a favorable compliment. He took a copy of the paper with him and was generally burdened with a roll under his arm about the size of a stove pipe. Sometimes the boys in strange towns would tease him by trying to take away his newspapers but he would kindly give them a few pennies, thus making them his fast friends.

The story of this harmless mild maniac is as follows: Having studied law and being considered a man of immense ability he was considered a fine catch by the young ladies of his acquaintance. His special attention was attracted to a very beautiful young blonde, and winning her heart she became his fiancee. But young Free was poor and he determined that before he married such a noble lady he would accumulate a small fortune. So at the age of twenty-one he joined the "Forty-niners" in their search for gold in California. He and a partner were successful in the "digging" and soon bought mule teams to transport provisions and other mining supplies to the mines in the interior, hoarding their gold in their shack, and one of the partners staying with it while the other drove the mule team. One day "J. N." returning from his trip found that his partner had departed with the entire treasure, the savings of many days and nights of labor and exposure. Young Free followed the thief to New York where he found that he sold the gold and departed for Europe. Free could not expect to catch him in those days, but put an attachment on the gold, but at the trial, which he conducted with marvelous logic and eloquence he could not prove that the gold was his, as there was no private mark on it; or, if there had been, it had been removed. Neither could he prove that his share of the gold had been stolen. He lost the trial, he lost his gold, he lost his bride, he lost faith in humanity, he lost his mental balance and became a wanderer throughout the length and breadth of his native land for fifty-six years. But in all this time he paid no carfare or hotel bill. He would go to the railroad officials and procure a pass on one pretext or another, they being unable to refuse because of his importunity and the uniqueness of the claim upon which his right to the favor was based.

Some were dated for a trip, some for a year and some for life. Some were given for "Opening the eyes of the blind to the Pearly Gates of Heaven" for "Lifting the Veil of truth"; as a "Philosopher traveling for the dissemination of knowledge and various other themes; but always claiming that the people were not ready for him yet, but that when they were he would "lift the pressure."

This "Pressure" so frequently spoken of by him, referred to the state of mind or spirit of the one addressed; whether happy and inclined to lightness and charity (especially towards himself) or melancholy and parsimonious. When sad he advised the lifting of the veil to "let the sunshine in."

Once he received a pass by way of a joke from a railroad official to walk over the ties from a certain place to another. When the conductor came in to take up the fares "J. N." commenced to walk rapidly from one end of the car to the other. When asked for his fare he presented this paper. "But," said the conductor, "this is not a pass to ride on this car, it is a pass to walk over the ties." "Am I not walking over the ties?" queried "J. N." as he rapidly resumed his walk. The conductor was so paralyzed by his wit and the stern commanding authority, that he did not further insist on the payment of a fare. The same tactics were practiced on the hotel keepers as on the railroad officials.

The writer remembers of hearing him telling a story of his stopping at a hotel for three days at two dollars a day! The landlord not wishing to lose the whole bill thought of a compromise by offering to throw off the half and take three dollars instead of six dollars, the entire amount. "Very charitable," said 'J. N.,' and it would be ill-bred in me to not return the favor by throwing off the other half of the bill, I never allow a man to excell me in favors."

The landlord had perhaps anticipated something of the kind, retorted by asking "J. N." if he would not partake of a light meal prepared for him in the dining room, to which "J. N." willingly assented. Upon entering the dining room the landlord invited "J. N." to be seated at a small table upon which there were four brightly burning lamps together with a plate, knife, fork, and spoon and a glass of water. For once in his life he was beaten and the "pressure" was heavy on himself. Page upon page might be written of the anecdotes of this strange personage, but the above serves to illustrate his style and manner. Along in the seventies, he and his brother Henry traveled together, selling his lightning calculator, a table he had copyrighted to aid in adding rapidly. Figures could be put down no matter how large or how many and he would write the answer down as fast as his hand could move. "J. N." would get the crowd and Henry sell the calculator.

While the ex-confederate president, Jefferson Davis, was confined in a casement of Fortress Monroe, "J. N." called and asked to see him and contrary to all strict orders obtained entrance to the apartment of the noted prisoner. Nothing seemed to please him better than to exhibit the newspapers containing a paragraph that Jefferson Davis had been visited by a lunatic.

Thousands of persons in all the states of the union were acquainted with "The Immortal J. N., Philosopher." Many times during his life his death was published in the papers and many were the amusing remarks he made upon seeing and reading them himself. Thus lived and died one of the most notable men of this section. His memory was faultless and if he ever met a person he never forgot his name or his face, but could call him by name and name the place of meeting without mistake, and had he not met with mental infirmity his name might have gone down to posterity as one of the intellectual giants of the age. As it is, he is kindly remembered by all who met and became acquainted with him.

His death occurred at the State Hospital for the Insane at Toledo, O., on June 26, 1906, and he was buried at McKutchinsville, Ohio. Peace to the memory of the kind old philosopher.

CHAPTER VII.

TRANSPORTATION.

First Roads and Bridges—Steam Railroads—Electric Roads.

The first roads in the county were for years scarcely more than blazed paths through the woods. Very many places would have been utterly impassable had it not been for a system of bridging, then extensively indulged in, known as "corduroy." This was a kind of railroad in which the position of the ties and rails on an ordinary railroad were reversed. That is, the ties were laid lengthwise and the rails crosswise. But as timber was abundant, and not much attention was paid to the smoothness of the road, they were not so very expensive.

Among the records of the county for 1829 is found the following, which was presented at the June session of the commissioners:

"A petition being presented by sundry citizens of Hancock County, praying for a county road, commencing at the county line at John Smith's farm, running thence a northwesterly direction to John Longs, in Section One, thence to cross Blanchard Fork at or near John J. Hendricks, thence to run down the river to the mouth of the three-mile run, thence to the nearest and best direction to Findlay, which was granted, and John Huff, John J. Hendricks and William Moreland were appointed viewers, and William Taylor, Surveyor." On the 16th of September the commissioners met in special session to receive the report of the viewers of said road. Report received and the road established. This road is the one now known as the Findley and Vanlue road, which crosses the river at the farm of William Wyer.

Again in August, 1839, the county commissioners met for the purpose of apportioning the amount of three per cent fund on the several state roads, and the record says: "Whereupon it is agreed on by said commissioners that the aforesaid amount of money appropriated, shall be laid out on the following roads, to-wit: The road leading from Bellefontaine to Perrysburg, and the road leading from Upper Sandusky through Findlay to Defiance, which work is to be performed in cutting out said roads, thirty-two feet wide, all timber twenty inches in diameter, and clearing the ground of all timber."

Another petition was presented to the commissioners July 21, 1831, "Humbly representing that it would but conduce much to the public convenience if a county road was established between the following points, to-wit: Beginning at the west end of Main Cross Street, in the village of Findlay (at a point where West Street crosses Main Cross Street, at the residence of Mrs. Dr. Detwiler), thence on the nearest and best route to Solomon Foglesong's improvement on Toway Creek, thence on the nearest and best route in direction of Toway Village (now Ottawa, Putnam County), to the county line." This is now one of the best roads in the county.

After these followed the location and opening up of the Tiffin, Port Clinton, New Haven, Lima and other important roads. In fact, for the first ten years after the organization of the county, the principal part of the business of the Board of Commissioners, was to receive petitions for, and confirm reports of reviewers and surveyor of county roads. Such has been the desire of the people, and the acts of the commissioners, that we have now public highways running by and bordering on almost every farm in the county, thus affording to everyone an easy and convenient means of communicating with his neighbors.

The "Road from Fort Meigs, or the foot of the Rapids of the Miami of the Lake (Maumee), to Bellefontaine, opened December 11, 1829." This is the road now known as the Perrysburg and Bellefontaine state road, which crosses the county from north to south, and divides it into two almost equal parts. This road was laid out on and near "Hull's Trail."

The commissioners of Wood County, on the 6th day of June, 1826, "Ordered that four hundred dollars of the road fund be appropriated for Hancock County, to be expended on the Urbana road in said county." This road was the Perrysburg and Bellefontaine road.

BRIDGES.

For many years the inhabitants of the county contented themselves by bridging the smaller streams and water courses, wherever absolutely necessary, and then only with a temporary structure, barely answering the purpose of its building, without a thought of bridging the river. The latter seemed to them so immense an undertaking that no one dared mention such a project. In 1841, when it was seriously contemplated to build a bridge across the river at Findlay, the matter was deemed of so much importance, that this order was made: "Ordered that the auditor instruct the assesors to take the vote of the people as to the propriety of laying a tax of eight hundred dollars for building a bridge across Blanchard River in Findlay." How the voters of the county decided the matter does not appear by the records, but the inference is, that they "seconded the motion," for in March, 1842, the following resolution was passed by the county commissioners: *"Resolved,* That the auditor receive proposals for building two bridges across Blanchard River, one at Findlay, and the other at the crossing on the Fidlay and New Haven State road (known as the Marvin Bridge), until the first day of April next, agreeable to the plans now in this office, as submitted to the commissioners, one half the pay in January, 1843, and the other half in one year thereafter." On opening the bids, at a special session, January 7, 1843, for the completion of the extension of the bridge across the river at Findlay, it was found that James Robinson was the lowest bidder, and the contract was awarded to him.

In the proceedings of the commissioners at a special session in March, 1843, it was "Ordered that the auditor of Hancock County, Ohio, inquire into the cause why the bridge across the Blanchard Fork of the Auglaize River, at Findlay, is not completed agreeable to contract by S. Carinn and H. Eaton, and if no good cause is shown, institute a suit against said contractors, and employ counsel if necessary." June 1, 1843, the commissioners "Ordered that the auditor of Hancock County enter a suit against the contractors of the bridge at Findlay, by the first of July next, if the same is not by that time finished to the satisfaction of the commissioners."

It is fair to presume that the bridge was finished to the "satisfaction of the commissioners," as there is no record of a suit being brought. The bridge was a wooden structure, known as a trestle bridge, the superstructure being supported by wooden trestles, placed, perhaps, twenty feet apart. The finish was of the plainest kind, only ordinary railing, no cover, no paint.

In 1850 the contract for a new and better bridge across the Blanchard, was let to Jesse Wheeler, William Klamroth and Edwin B. Vail, for the sum of fifteen hundred dollars. It too, was a wooden structure, but of a different plan, not only more pretentious in appearance, but a much more substantial piece of work. It consisted of two spans, being supported at the ends by massive stone abutments, with a pier in the centre, of the same material. The sides were elevated, it being a truss-bridge and inclosed, and the whole covered with a shingle roof. There was a double track for wagons, with a foot path on either side. The bridge when finished and opened for travel, was regarded as a superb piece of work.

But in time, this structure wore out, and decayed, and the business and travel of the county demanded a better bridge. One that would not only answer the purpose for which it should be intended, but which would also be an honor to the county, and an ornament to the county seat. In 1873 the old bridge was torn down and the Canton Iron Bridge Company, under contract with the county commissioners erected a substantial iron bridge, at a cost to the county of about thirteen thousand dollars. This bridge erected in 1873 was among the first iron bridges built in the county, and was allowed to do service until 1889 when it was removed to a point about a mile west of Miami Street, and re-erected over the river north of the cemetery. Previous to the building of any of these bridges, the river was crossed by canoes when too high for teams to be driven across.

At the March session in 1839, John Byal, Aquilla Gilbert and Daniel Fairchild, commissioners, "Ordered that there be appropriated for building a bridge across Eagle Creek, at what is now called the Upper Ford, or where the Milmore and Findlay State road crosses the creek, the sum of ten dollars, provided, there is a good and sufficient bridge erected thereon before the first day of November next." This bridge was to be built where the Sandusky Street bridge now is. What would our friends in East Findlay, and in the eastern part of the county say to a ten dollar bridge at that place now. But they must remember, that when this order was passed, that the place designated for the bridge, was a considerable distance out in the country.

In 1845, the sum of $940 was expended in the county for bridges. Numerous bridges, wooden structures, were built across the river at various times, and were gradually replaced by other and better structures, until now there are not less than thirteen good, substantial bridges spanning the Blanchard river within the limits of the county. Besides these, there are scores of smaller iron and wooden structures spanning the numerous creeks and water courses. The value of these bridges, is quite considerable, and their convenience to the population, cannot be estimated.

STEAM RAILROADS.

On April 26th, 1839, at a special session of the county commissioners it was "Ordered that we, the commissioners, agree to subscribe one hundred shares, amounting to one hundred thousand dollars, to the capital stock of the Bellefontaine and Perrysburg Railroad, and that in our incorporate capacity, we will place our signatures to the books of the company for that amount.

John Byal,
Daniel Fairchild,
Commissioners.

With all our wealth and population, at the present, no such liberal terms towards any railroad project would be entertained by our commissioners. At the same meeting, for it seems that the commissioners meant business, it was ordered "That we appoint a special commissioner to negotiate the loan on the credit of the county, in the City of New York, or elsewhere, at the rate of interest not to exceed six per cent per annum," and it was "Ordered that Parlee Carlin be delegated our special agent, to negotiate the loan of one hundred thousand dollars which we have this day subscribed to the capital of the Bellefontaine and Perrysburg Railroad Company." Thus ends the history of this railroad, so far as this county is concerned. Like an innumerable number of such projects, it ended in talk, and futile resolutions and orders.

In 1845 the railroad fever again broke out in the county, and the commissioners went earnestly to work to make some project a success. They were not wholly disappointed, for they set on foot a movement, which finally resulted in the building of the Findlay Branch of the Mad River and Lake Erie Railroad, as it was then called.

On the 4th day of March, 1845, George Shaw, Peter George and John Lafferty, commissioners, issued a proclamation to the qualified voters of Hancock County to vote at the election of the first Monday of April, 1845, for or against a proposition to subscribe to the capital stock of the Mad River and Lake Erie Railroad and that the auditor have said proclamation published in three newspapers published in Findlay, until the April election. The returns of said election were made and counted and certified as follows:

	For	Against
Washington Township	6	135
Amanda Township	30	87
Jackson Township	40	50
Cass Township	31	83
Findlay Township	243	4
Eagle Township	67	39
Van Buren Township	6	36
Union Township	121	4
Pleasant Township	44	2
Big Lick Township	55	26
Delaware Township	1	121
Marion Township	107	5
Portage Township	65	61
Liberty Township	120	5
Madison Township	..	64
Orange Township	17	41
Blanchard Township	102	1
Totals	1,055	784

On April 11, 1845, the commissioners, in their corporate capacity subscribed to the capital stock of the Mad River and Lake Erie Railroad Company, twelve hundred shares, of fifty dollars a share, making in all, the sum of sixty thousand dollars. Wilson Vance, William Taylor, John Patterson and William Henderson were appointed agents to meet with the railroad company, and they were authorized to employ a special messenger to go to Perrysburg to get the bonds printed in a neat manner, at as reasonable a compensation as they could agree upon.

On April 22, 1845, the commissioners, in special session, issued bonds for the sum of thirty thousand dollars, payable to the Mad River and Lake Erie Railroad Company, as first payment of sixty thousand dollars subscribed. At the June session of the commissioners, John Ewing and Jacob Barnd were added to the railroad company commissioners.

On September 11, 1845, the County Commissioners subscribed three hundred shares, amounting to fifteen thousand dollars, in addition to the sixty thousand dollars already subscribed. At the same time, Squire Carlin was appointed railroad commissioner in place of Jacob Barnd, deceased.

On August 19, 1846, the Mad River and Lake Erie Railroad Company accepted the subscription of seventy-five thousand dollars, and agreed to build the road. On September 22, 1846, the Commissioners of the County appointed John Ewing, John Patterson and Hiram Smith Commissioners to manage its construction.

The road, however, was not completed and put in operation until the latter part of December, 1849. This road, commencing at Findlay, takes a south-easterly course through Findlay, Marion and Amanda. Townships, to Carey, Wyandot County. It crosses the Blanchard River in Marion Township. It is about sixteen miles in length, and was originally constructed on a cheap plan. The iron rails were simply strap iron, as it was termed, laid on stringers, placed lengthwise on the roadbed. In this condition it remained for many years, always paying large dividends to the company, but furnishing very inferior accommodations to the county. Finally, however, by an arrangement entered into, between the officers of the road and the county commissioners, the company agreed to (and did) repair the road, lay the track with "T" rails, and build a passenger house at Findlay.

In 1853, at the time the Dayton and Michigan Railroad project was under consideration, it was supposed, and perhaps promised, that Findlay should be one of the points on the route, and our people became enthusiastic over the matter. In July, 1853, the commissioners of the county subscribed one hundred thousand dollars to the capital stock of the company. A preliminary survey was made of the line, and we felt reasonably sure of the road. In this we were disappointed. The management, for some reason, selected a route farther west, missing this county entirely, and thus ended this railroad project, so far as Hancock County was concerned. The road was built on a line farther west, and has proved a paying investment, a good business road, but no more so than it would have been, had the route through our county been chosen. And the road would have been of immense advantage to us.

After it was definitely settled that we were not to have the Dayton Michigan road, or about that time, a project to build a road from Fremont, in Sandusky County, to Union City, a town on the line of Ohio, and Indiana, by way of Findlay and Lima began to be agitated. Henry Brown, Esq., the editor of the "Hancock Courier," of Findlay, taking the lead in the matter, and setting forth in glowing terms the advantage to be derived from such a line of road. Finally the matter took form and a company was organized and chartered under the name of the "Fremont and Indiana Railroad Company" to construct a road from Fremont, Ohio, to Union City, on the Indiana line, by way of Findlay and Lima. A survey of the route was made, which was decided to be practicable. Subscription books were opened, and stock readily subscribed. The principal stockholders in Findlay were Judge Corey, S. and P. Carlin and Bass Rowson. Judge Corey and Squire Carlin were directors. After much delay, caused by the difficulty in collecting subscriptions, and inability to procure iron, the road was not completed to Findlay until 1861. About this time, the company became embarrassed, and the road was sold. The purchasers organized a new line company, under the name of the "Fremont, Lima & Union Railroad Company," and this company, in 1865, consolidated with the Lake Erie & Pacific Railroad Company, under the name of the Lake Erie & Louisville R. R. Company, but the road was not completed and operated to Lima until about the winter of 1873. From that time until 1878 the road was operated, most of the time being in the hands of the receiver.

Some shrewd eastern capitalists seeing the advantage of such a line, bought the road, and at once set themselves to work to develop its resourses. They extended the line from Celina, in Mercer County, Ohio, to Muncie, Indiana, thus making good western connections, also connecting with Chicago. The name of the road was changed to that of Lake Erie & Western, the better to erpress its intentions. Connections were sought and obtained with St. Louis. The road was extended from Fremont to Sandusky City, on Lake Erie, and to-day this is regarded as a "Trunk Line," and the business has brought it well up to the front. This road enters the county at Fostoria, in Section 1, Washington Township, then runs in a southwest direction, passing through the townships of Cass, Washington, Marion, Findlay, Liberty, Eagle, Union and Orange, and crossing into Allen County at Bluffton. There is about twenty-five miles of the road in Hancock County, and its business at Findlay and other points, amounts to many thousands of dollars.

The citizens of McComb and vicinity, having been several times disappointed in their expectations of the completion of the Continental Road, which had been graded through their town, conceived the idea of building a line of roads to intersect the Dayton & Michigan at Deshler, about eight miles distant, went to work earnestly in the matter, and having made satisfactory arrangements with the Dayton & Michigan, organized a company to construct the McComb and Findlay Railroad. The work was pushed rapidly forward, and the road completed in January, 1881. About sixteen miles of this road is in Hancock County.

The New York, Chicago & St. Louis company was incorporated in 1880 to construct a line from Buffalo to Chicago, and having bought up the right of way and graded line of the "Continental Railway," extending from Tiffin, Ohio, to Ft. Wayne, Ind., built the road from Fostoria to Arcadia, where striking the Continental roadbed they followed it through McComb, and westward to Ft. Wayne and on to Chicago. Findlay made an effort to get this road into town, but it passes about four miles to the north, yet all trains are met at Mortimer by the Findlay street car service which delivers passengers from Findlay to Mortimer and vice versa.

The McComb, Deshler & Toledo Railroad Company was incorporated June 2, 1879, by a number of McComb citizens, and on November 24, 1880, the first train ran into McComb. Later the branch was extended to Findlay and is now known as the C. H. & D. branch.

The Toledo, Columbus & Southern railroad was chartered in May, 1881, and in the winter of 1881-2, the right of way was obtained from Toledo to Findlay. The work was commenced in the summer of 1882. The first rail was laid December 15th, and the first locomotive ran into Bowling Green from Toledo on Christmas day. January 30, 1883, the connecting rail was laid some fifteen miles north of Findlay in Wood County, which connected Findlay with Toledo. The first through train came over the road from Toledo to Findlay February 7, 1883. The road extended south to Columbus in 1886.

The Toledo & Ohio Central, as it is known, extends from Toledo to Corning, via Columbus, Ohio.

The Cleveland, Delphos & St. Louis Railroad was chartered March 9, 1881, and during the summer work was commenced. The road from Bluffton to Arlington was completed early in the fall of 1882, and in December the construction train reached Mt. Blanchard. Early in the spring of 1883 it run its trains to Carey. This line is now known as the Northern Ohio.

The American Midland Railroad was commenced and constructed through the western part of this county in 1888. Its eastern terminus is Findlay, O., and the western terminus is Ft. Wayne, Ind. About 1902 the road passed into the hands of the C., H. & D., and just recently been purchased by the Baltimore & Ohio system.

ELECTRIC ROADS.

Findlay and Hancock County now have three electric interurban lines; the Western Ohio from Lima; the Toledo, Bowlingreen and Southern from Findlay to Toledo via Bowlingreen, and the Toledo, Fostoria & Findlay, from Findlay to Toledo, via Fostoria.

With seven points of ingress and egress by steam and three by electric roads Hancock County is fairly well provided for as to transportation of passengers and freight.

CHAPTER VIII.

THE COUNTY'S MILITARY RECORD.

The War of 1812—The Mexican War—The Civil War—Spanish-American War.

THE WAR OF 1812.

Almost a century has passed since the arrogance of the English government in its dealings with this republic brought on the War of 1812. And though the struggle ended more than five years before the erection of this county, the territory embraced within the limits of the latter was directly affected in the earliest stages of the war.

As the consequence of England's arbitrary action in enforcing the "right of search" in impressing American seamen; her restrictions upon commerce, and her instigations of revolt against the United States by the Indians, Congress on the 4th of June, 1812, passed a resolution declaring war against England; on the 17th of the same month the bill passed the senate, and two days afterwards President Madison issued the proclamation.

Ohio had been preparing for the conflict, and troops had already begun assembling at Dayton, Springfield, Urbana and other points, in obedience to the call of Governor Meigs. General William Hull was appointed to the chief command of the state troops, and on June 16th the army left Urbana on its march toward the Maumee Rapids, Colonel Duncan McArthur being ordered in advance to open a road through the forest from the Greenville Treaty Line to the Scioto River. Here they erected a fort comprised of two blockhouses and named it Fort McArthur, in honor of the officer whose regiment had opened the road. The rest of the army arrived at the fort June 19th; and on the 21st Colonel James Findlay was ordered to open the road as far as Blanchard's Fork. Proceeding on his mission, he arrived at a point just north of what is now the county line between Hancock and Hardin Counties. Here on account of rain and mud he was compelled to discontinue his march and erect a blockhouse, which was called Fort Necessity. This fort was constructed on the southwest quarter of the southwest quarter of Section 36, Township 2, south, Range 10 east, Madison Township, now owned by Fannie Isenberger. It has been stated that this fort was erected about half a mile west of the Perrysburg and Bellefontaine state road. However, the government survey of 1819 locates the site of the fort within five chains (twenty rods) of the southwest quarter of Section 36, which is seven-eighths of a mile west of the above mentioned road. From this point Colonel Findlay moved to the Blanchard's Fork, and here erected a fort, which was named in honor of that officer. Here the army encamped for some time, while Colonel Findlay proceeded to advance and opened the road as far as the Maumee River.

From Fort Necessity what is commonly known as "Hull's Trail," followed the west bank of the east branch of Eagle Creek to near its junction with the west branch, crossing the latter and continuing down the west side of Eagle Creek to Fort Findlay. Here it crossed the river, and thence ran northward, a short distance east of the Perrysburg and Bellefontaine state road, till reaching the highlands south of the middle branch of the Portage river; thence following the course of that stream northward, into what is now Wood County, and thence to the Maumee Rapids. Some pioneer settlers expressed doubt as to Fort Necessity being formed by erecting a Blockhouse, claiming they never heard it mentioned as other than a mud fort. But taking American State papers as authority, there evidently was a blockhouse of some sort erected at that place.

General Hull on leaving Fort Findlay, left behind a small garrison under Captain Arthur Thomas, to complete and guard the fort, which was well calculated to successfully resist any ordinary force which might be brought against it. It stood on the south bank of the Blanchard River in Findlay, at what is now the northwest corner of Main and Front Streets, the southeast blockhouse being located on the site of the present Cusac block.

The fort consisted of a stockade about ten feet in height, with a two-story blockhouse built of round logs, at each corner. The enclosure was fifty yards square, the entrance or gate being on the east side. A ditch surrounded the stockade, the earth from the excavation having been thrown up against the pickets to give them added strength. The outer walls of the blockhouses projected a short distance from the stockade and the upper story of each extended a few feet over the lower one, thus commanding the approaches from every direction. Each blockhouse was thoroughly loopholed and furnished with one piece of artillery. Within the enclosure a number of cabins for the use of the soldiers were erected along the stockade, the open space in the center being utilized as a parade ground. To guard against surprise from attacks of the enemy the forest was cleared off for a considerable distance on the south, east and west of the fort while the river on the north afforded a clear view.

Some pioneer testimony has been formerly published showing some difference of opinion in regard to the number of blockhouses which Fort Findlay originally contained. The earliest settlers, however, testify to having seen three blockhouses in a fair state of preservation and the one at the northwest corner partly destroyed. Later comers noticed only the one standing at the southeast corner of the fort, which was used for some time by Wilson Vance as a stable. There is testimony showing, however, that when Mr. Benjamin Cox came to Fort Findlay, three of the blockhouses were still standing and were occupied by Wyandot Indian families. The probabilities are that the portions of the stockades and blockhouses which were not in existence when some of the later settlers arrived had been torn down and utilized for firewood and in erecting outbuildings.

"The passing years have removed and utterly obliterated all traces of Fort Findlay, due no doubt to the rapid progress of civilization. But, how sad, to think that where once stood one of the earliest structures which marked the first noble and daring stride toward civil liberty and Christian civilization, not even a wooden headboard is now visible to mark the solemn and sacred ground where died the noblest relic which ever graced the soil of our fair city, not as much on account of any great achievement that had ever been obtained, but from the motive which prompted its erection."

In July, 1812, General Edward W. Tupper, of Gallia County, raised a force of 1,000 men for six months' service, principally from Gallia, Lawrence and Jackson Counties, who, under orders of General Winchester, rendezvoused at Urbana. From there General Tupper folfollowed Hull's trail to Fort McArthur, where he established his base of supplies, and then marched northward to Fort Findlay. After a much needed rest, his command pushed on to the foot of the Maumee Rapids. The Indians appearing in force on the opposite bank of the Maumee River. Tupper attempted to cross the river and attack them, but the rapidity of the current and the feeble, half-starved condition of his men and horses rendered the attempt a failure. The enemy soon after took the offensive, and, crossing the Maumee, attacked the American camp, but were defeated and driven back with considerable loss. This defeat caused them to retreat hastily to Detroit and Tupper subsequently marched back to Fort Findlay and thence to Fort McArthur.

The following anecdote in connection with the Fort, is found in "Howe's Historical Collection:"

"About nine o'clock one dark and windy night in the late war, Captain William Oliver, in company with a Kentuckian, left Fort Meigs for Fort Findlay, on an errand of importance, the distance being about thirty-three miles. They had scarcely started on their dreary and perilous journey when they unexpectedly came upon an Indian camp, around the fires of which the Indians were busy cooking their supper. Disturbed by the noise of their approach, the savages sprang up and ran toward them. At this they reined their horses into the branches of a fallen tree. Fortunately the horses, as if conscious of the danger, stood perfectly still and the Indians passed around the tree without making any discovery in the thick darkness. At this juncture Oliver and his companion put spurs to their horses and dashed forward into the woods through which they passed all the way to their point of destination. They arrived safely, but with their clothing completely torn off by the branches and brushes, and their bodies bruised all over by coming in contact with the trees. They had scarcely arrived at the fort when the Indians in pursuit made their appearance, but too late, for their prey had escaped."

During the occupation of Fort Findlay, which lasted until the spring of 1815, a man named Thorp kept a small sutler store immediately east of the fort. Soon after the war closed the fort was abandoned, and its garrison returned to peaceful avocations.

THE MEXICAN WAR.

The direct cause of the Mexican war was the disputed territory lying between the Nueces and Rio Grande rivers, Texas, having won its independence, and been admitted into the union, claimed the Rio Grande as the boundary line, while the Mexican authorities disputed this claim, asserting that it was the Nueces river. The United States government proposed to settle the controversy by peaceful negotiations, but Mexico scornfully refused, and made threats of occupying the territory in dispute.

To be prepared for any contingency, in March, 1846, General Taylor was ordered to advance to the Rio Grande with a few thousand men, which he had organized at Corpus Christi, near the mouth of the River Nueces. He erected Fort Brown opposite Matamoras, which was accepted by Mexico as a declaration of war, and on the 20th of April, 1846, General Arista, the Mexican commander on the Rio Grande, notified General Taylor that hostilities had begun. On the same day a small force of American cavalry was attacked by the Mexicans on the east side of the Rio Grande, and here occurred the first bloodshed of the war. Hancock County was then very thinly settled and when the call for troops reached this portion of Ohio the quota of the county was full. A company, however, was recruited from Hancock and Putman Counties and offered to the government, which replied that their services were not needed. However, a dozen or more from this county went to the war, but the greater part of them enlisted in outside companies and there being no enumeration returns to show just who went from this county, it is impossible to give a full list of names, but it is known that the following residents of this county enlisted: Allen Royce, H. Jeremiah Yates, Loami Farmer, and Dr. Wm. D. Carlin. Mr. Carlin was commissioned as assistant surgeon in the Fifteenth United States Regulars, April 9, 1847. But the surgeon having other duties which required the most of his time, Mr. Carlin, by active service, though not in name, filled the position of surgeon. His commission was signed by James K. Polk, then president of the United States. The news of the victorious entry of the American Army under Scott into the City of Mexico, on September 14, 1847, which was hailed with patriotic enthusiasm all over the county, in spite of the adverse comment of some of the Whig leaders, who bitterly denounced the war, which they regarded as a party scheme for the extension of slavery.

THE CIVIL WAR.

The surrender of Fort Sumter, on April 14, 1861, marked the beginning of a new era in the history of our country. It brought to a final and decisive issue the long-vexed questions of State Rights and Slavery and inaugurated a crucial test by which the solidity and perpetuity of the republican form of government was to be definitely ascertained. The tension between the opposing parties in the nation had finally reached the breaking-point; the slender cord of mutual interest snapped, and, with desperate resolution on one side, and firm, resourceful, patriotic purpose on the other, the Titanic struggle was begun.

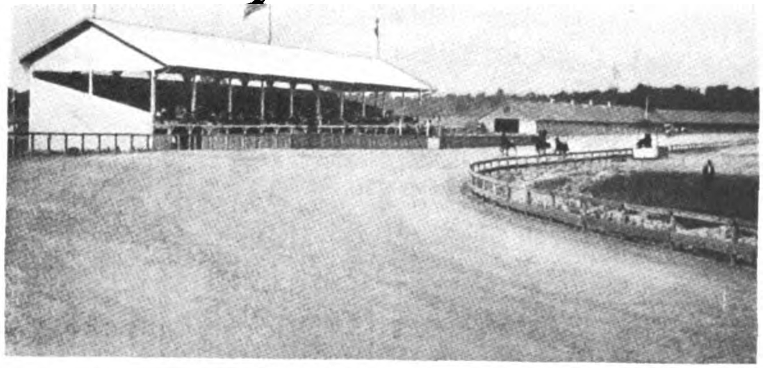
Never since the days of the Revolution were the people of this county, this state, this nation so thoroughly aroused as when the news flashed over the wires of Major Anderson's capitulation. From all sections of the free states, regardless of political affiliations, voices went up with fierce determination to defend and preserve the Union. Volunteer companies sprang into existence as if by magic, and large amounts were contributed by state legislatures, private corporations and individuals to defray the expenses of the coming struggle for national unity, Hancock county was in harmony with the patriotic sentiments of the nation and enthusiastic expressions of loyalty to our time-honored flag fell from the lips of old and young. Findlay, being the county seat, was the principal point where public sentiment found outward expression and the action taken here will serve to illustrate the patriotism of the people throughout the county.

Early on the morning of April 17, 1861, a few national flags were thrown out to the breeze, the sight of which seemed to kindle a patriotic fire in every heart. Presently a large American banner was suspended across Main Street from the court house to Reed's Hotel. The town soon began to present a lively appearance, and when the band headed by the Stars and Stripes commenced promenading Main Street the martial spirit in many loyal hearts broke forth in cheers. About 10 o'clock a. m., a cannon, owned by the local Democratic organization, was brought forth and accompanied by several hundred citizens on foot and horseback was taken across the river and a salute of thirty-four shots fired in honor of the Union. Enthusiasm was abundant, and party lines were entirely forgotten. Towards noon another large banner was suspended across Main Street, and flags of every size were floating from nearly every business block and numerous private residences. Two liberty poles were raised in the afternoon on the opposite corners of Main and Main Cross Streets and the American flag run up on each. Afterwards other poles were raised from fifty to eighty feet in height and mounted with the Stars and Stripes.

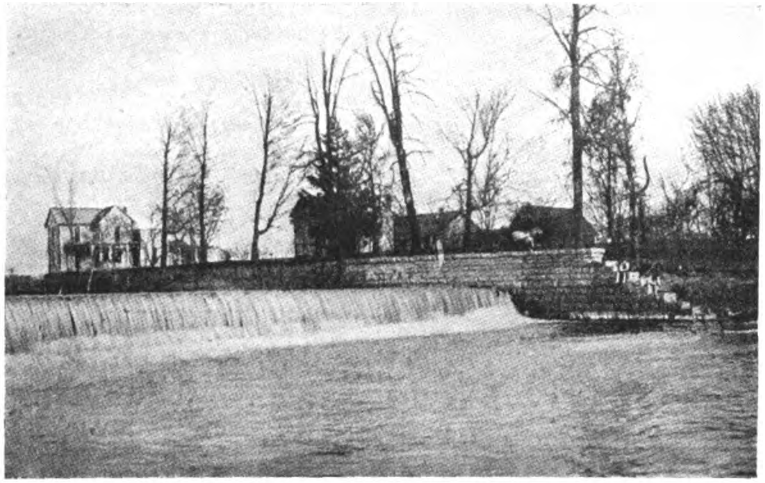
On the following afternoon, pursuant to a call issued April 17th, an enthusiastic assemblage of citizens convened at the court house. Edson Goit was made chairman and Philip Ford and S. J. Mills appointed secretaries. Mr. Goit on taking the chair delivered a patriotic speech, which was frequently interrupted by outbursts of applause. He said the government should be sustained at all hazards and the man who in this emergency opposed the execution of the laws should be denounced as a traitor. On motion of J. M. Palmer, a committee consisting of Messrs. Aaron Blackford, J. M. Palmer, A. P. Byal, W. W. Siddall and Israel Green was appointed to draft resolutions expressing the sentiment of the meeting. During the absence of the committee the enthusiasm was kept at fever heat by patriotic soul-stirring and at the same time appropriate music and speeches. The band played Hail Columbia, and the Star Spangled Banner was called for and sung by Messrs. N. Y. Mifford, Dwella M. Stoughton and William Mungen, the vast audience rising and joining in the chorus. Cheers were given after each verse by the assembled multitude till the very building seemed to join in the enthusiastic patriotism of the people and echo back their sentiments.

A brief speech was made by James A. Bope, denouncing treason and secession and calling upon all to rally around the flag. Amidst frequent applause William Mungen declared himself "in favor of our country, right or wrong." The time, he said, was now past for party questions, and as a Democrat of the strictest school, he asserted that in the present alarming condition of the country, political questions should be forgotten. William Gribben, who followed, said that armed traitors had conspired together for the destruction of our government, that our national flag had been insulted and trampled upon by the enemies of our country, and declared that the honor of the glorious old banner should be up-

LANDING, RIVERSIDE PARK, FINDLAY



RIVERSIDE DRIVING PARK, FINDLAY



RIVERSIDE PARK DAM, FINDLAY

RESIDENTIAL SECTION OF HARDIN STREET, FINDLAY

held. At this point the committee on resolutions presented the following report, which was adopted amid vociferous applause:

"Whereas, A band of armed traitors to the government of the United States have leagued together for the avowed purpose of overthrowing the constitution and laws of our beloved country, and to insult and strike down the ensign of our nation, which has given to the American citizen ample protection at home and abroad, and to our country consideration and dignity wherever its stars and stripes have been seen and known, and

"Whereas, In pursuance of such treasonable intent, those traitors have once struck down that glorious flag, and now threaten with a myrmidon host in arms to seize our national capital, to trail our nation's honor in the dust and transform this free government into a cruel monarchy; therefore,

"Resolved, That whatever differences of opinion have divided us in the past, today we are united and are animated by one purpose, and that is an unyielding and undying devotion to the Union, and determination to stand by the government and the flag of our country. Living we stand shoulder to shoulder and fight in their defense; dying we bequeath this purpose to our children.

"Resolved, That in the present civil war so wantonly begun by traitors now in arms against our government the only issue presented to every American citizen is: Shall our constitutional government stand against the rebel and revolutionary force that now threatens its destruction? Or shall it yield to treason for a despotism to be erected upon its ruins. 'He that is not with us is against us.'

"Resolved, That as our revolutionary fathers, with a firm reliance on the protection of Divine Providence eventually pledged to each other their lives, their fortunes and their sacred honor for the purchase of these civil and religious liberties by them transmitted to us, and that we have so long enjoyed, we, their descendants, with a firm reliance upon the same Divine and all-protecting Power, mutually make the same sacred pledge to each other for the preservation and perpetuity of that inestimable inheritance by them bequeathed to us."

Upon the adoption of the foregoing resolution Judge Palmer addressed the meeting in an eloquent speech full of patriotic devotion. James M. Neibling was then called for and began by saying that fourteen years before, when only a boy, he shouldered his musket at the call of his country to assist in chastising Mexican arrogance, and he was ready to go again if his country's cause demanded his services. This declaration was received with unbounded applause. After some further remarks upon the necessity of union and immediate action he presented the roll of enlistment for volunteers, under the call of President Lincoln for 75,000 men, issued three days before. In a very short time seventy-two names were down upon the roll, and the meeting then adjourned with cheers and expressions of loyalty to the flag. The volunteers were formed into line by Colonel Neibling and escorted by the band, marched down Main Street and disbanded to meet for another rally on Tuesday, April 23, which had been previously announced.

On that day people came from every part of the county, all seeming to be moved by the one prevailing sentiment of loyalty. Nothing was talked of but the defense and preservation of the Union. And in this great cause none were more deeply interested than the old gray-headed veterans who had so long enjoyed its blessings. Scores of pioneers publicly declared their readiness to shoulder a musket and march to the defense of their country. All seemed to be imbued with that same spirit of patriotic devotion and sacrifice which nerved the revolutionary fathers to win that glorious boon of liberty we now enjoy. Party prejudice was set aside and all labored together, hand in hand in that noble work of preserving the national honor.

By this time three companies of volunteers had been raised in Hancock County, which were afterwards mustered into the Twenty-first regiment, Ohio Volunteer Infantry, as Companies A, F, and G. In the afternoon companies A and F were each presented by the ladies of Findlay with a handsome flag. The presentation took place in front of the court house in the presence of the large assemblage which had come together on that day to attest their unswerving loyalty. Mrs. James Neibling made the presentaion speech and the flags were respectively received by Captains Wilson and Walker on behalf of their companies.

The fair grounds, then located in East Findlay on the Mt. Blanchard road, was selected as a place of rendezvous for the volunteers and was dedicated as Camp "Neibling," in honor of the gallant Colonel James M. Neibling, who afterward commanded the Twenty-first regiment on many a bloody field. On the 25th of April Mrs. Mary Mungen on behalf of the ladies of Findlay presented a flag to company G. Before the following day a delegation of ladies from McComb put in an appearance at Camp Neibling and presented another flag to the same company, most of which command were from the northwest part of the county. Miss Addie M. Price presented the beautiful banner and Captain Lovell received it and responded in appropriate terms.

A mass meeting was held at the court house, April 27th, for the purpose of arranging for a more thorough military organization of the county. James M. Neibling was elected chairmna and D. B. Beardsley secretary. Speeches were made by Messrs. James M. Neibling, Aaron Blackford and Abel F. Parker, advocating the proposed measure; and committees were appointed in each township to carry the project into effect. Meetings were soon afterward held in nearly every township, military companies organized and the patriotic ardor of the people was unabated. Several companies of home guards were also formed, consisting of men over forty-five years of age; but these organizations subsequently disbanded, because the term "Home Guard" soon became one of reproach and was flippantly used to designate the stay-at-homes or a class who were afraid to go into the army.

A vast amount of credit is due the various societies organized at divers times during the rebellion towards providing for the families of those who were willing to give their service and, if need be their lives for the cause of freedom. And especially is this true of the ladies of these societies, who did a great amount of good in gathering and forwarding sanitary supplies to hospital camps. In fact, the patriotic women of the county did their full share toward crushing the mightiest rebellion in the history of the world, not only in helpful actions and deeds which relieved the soldiers in the field, but also by enduring the heart-aches and assuming the responsibility of both parents' duties in the care of the children while the fathers were absent at the front—many of them, alas, nevermore to return. When finally the news of the capture of Richmond announced the approaching close of the struggle, it created the most intense and joyous excitement. The citizens turned out en masse; bells were rung and bonfires lighted in every town and village and an undercurrent of deep thankfulness pervaded the entire community. All hailed the good news as a harbinger of peace and happiness. With the fall of the rebel capital the war was virtually at an end; and although Lee made desperate efforts to save his army its fate was sealed, and the 8th of April, 1865, he surrendered to Grant at Appomattox court house; nine days afterward Johnston surrendered to Sherman.

The news of these glorious successes of the Union arms was received throughout the north with unbounded enthusiasm and heartfelt prayers were offered to the God of battles who in His infinite mercy had vouchsafed such a brilliant ending to the long turmoil of military strife. After four years of bloody war—after the sacrifice of hundreds of thousands of gallant men and millions of treasure, the great rebellion was at an end, the government preserved, and freedom perpetuated. A grand celebration was held at Findlay, April 14, 1865, to rejoice over the dawn of a glorious peace. The day was bright and cheerful, and nature seemed to smile on the exalted happiness of the people. The exercises commenced at six o'clock in the morning with the ringing of bells, and the firing of a salute of thirty-six guns. As the day wore on, crowds of people came pouring into Findlay. At ten o'clock services were held in several of the churches and shortly after noon a large audience gathered at the court house where appropriate addresses were delivered by Revs. Rose and Wykes. In the evening there was a fine display of fireworks and every business house, as well as many of the private dwellings were brilliantly illuminated.

"This joy, however, was short lived and suddenly changed to deep mourning. About ten o'clock the news of President Lincoln's assassination reached Findlay, and fell like a pall on the hearts of her citizens. Everyone was horror-struck at the awful deed, and never was there so much feeling manifested by the true and loyal hearts of Hancock County. In a short time all of the business houses were closed and draped in mourning and the flags dressed in crepe and raised, at half-mast. In the afternoon a public meeting was held at the court house to express the sentiment of the people on the assassination of the president, and deep gloom filled every honest heart.

"Soon after the war ended, the Union armies were discharged and the soldiers still remaining returned to their homes, and once more joy reigned supreme around hundreds of firesides in Hancock County. To the survivors and their children has been vouchsafed the blessings to witness the grand results of all their sacrifices, in a reunited country pursuing a common destiny, while the names and fame of those who fell, either on the battlefield or in the line of duty, has been commemorated through the pages of history and on the beautiful monuments of marble and bronze prominent in city, town and village all over this fair land of ours. They all went out with one common aim in view—to lay down their life, if necessary, to aid in the cause of freedom. They went cheerfully, wherever duty called them. They never shirked duty and never flinched under fire. They never retreated unless ordered so to do. They endured all the hardships of marching, fighting, and of prisons and more than five hundred of them laid down their lives without a murmur, that the noble cause, for which they fought, might be sustained for the benefit of future generations. They left father, mother, brother, sister, wife, children, all that was near and dear to them in this life, well knowing that for the last time they might look at their families' loving faces, and into their aching hearts; and for four long and weary years, both those at home and those engaged in the fight for freedom endured the hardships of one of the most bloody and cruel wars on record."

SPANISH-AMERICAN WAR.

Hancock County was represented in the Spanish-American War by some 162 soldiers, of whom 109 were members of Company A, 2d Ohio Volunteer Infantry, the rest being distributed mainly among other companies of the same regiment, with a few in various companies of other regiments.

COMPANY A, SECOND OHIO VOLUNTEER INFANTRY.

Company A was organized at Findlay as an independent military company in 1872, by Captain James Wilson, a veteran of the Mexican and Civil Wars; mustered into the National Guard, December 10, 1874; assigned to the Eleventh Regiment as Company B, July 6, 1876; local designation, The Findlay Guards; letter changed to "A" upon the mustering out of the Columbus Grove Cadets in 1879; designation changed to Company A, Second Infantry in 1883; mustered out April 14, 1899; reorganized August 17, 1899, and designated as Company A, unattached Infantry; assigned to the reorganized Second Regiment as Company A, November 13, 1899. Active service: Cincinnati riots, 1884; Wheeling Creek, 1894. War with Spain: Organized for the Volunteer service at Findlay, April 25, 1898; mustered in at Columbus as Company A, Second Ohio Volunteer Infantry, May 10, 1898; mustered out at Macon, Ga., February 10, 1899. Officers (commissioned): Tillman L. Lafferty, Captain; Ralph E. Barnd, First Lieutenant; Frank M. Biggs, Second Lieutenant.

Company K, Second O. V. I., had nine Hancock County "boys;" Company H, same regiment, six; Company B, two, and Company C, one. Company D. Sixth O. V. I., had fifteen members from this county, including the captain, Frank P. Culp. The following companies also contained one or more members each from Hancock County; Company F, Eighth O. V. I.; Company — Ninth O. V. I.; Company B, Twenty-first O. V. I.; Company —, Twenty-eighth I. V. L. A.; Troop C, First O. Cavalry; Company D, First Artillery; Company D, Second U. S.; Company E, Sixth U. S. Artillery; Company A, Eleventh U. S.; Company A, Seventeenth U. S.; Company B, Twenty-eighth U. S.; Twenty-eighth Bat. Art. Ind.; Company M, Thirty-fifth U. S.; Company H, 157th Ind.

CHAPTER IX.

THE BENCH AND BAR.

Early History—Famous Judges and Lawyers—Hancock County Bar Association—First Jail and Court-House.

It would not be commensurate with a historical sketch of the Bench and Bar of Hancock County to name all the judges who have presided on its bench, or to describe the numerous lawyers who have practiced before its courts; yet it is thought best to refer to the organization of its several courts and to name some of the early judges who held them and the members of the bar who practiced before them, as well as the judges and lawyers who located here.

The first judicial system to be organized in that part of the United States which is now known as the State of Ohio, was that put in operation by the "Ordinance of 1787," by which the vast "territory northwest of the River Ohio" was set apart as a separate government, and a local judicial system given to it under said ordinance. The court was to consist of three judges, any two of whom could form and constitute a court. This court was to have common law jurisdiction and the judges must reside in the district and have therein a free hold estate of not less than five hundred acres of land during the time they held their office, and their commission was to continue in force during good behavior. These judges, with the governor of said territory were to select from the civil and criminal laws of the original states such laws as they thought suitable for the territory and they were authorized to promulgate and enforce the law, until amended or repealed by a general assembly which was to be later organized according to the terms of said Ordinance under which they were appointed.

In accordance with such provision of the Ordinance, Congress on the sixteenth day of October, 1787, elected as judges for the Northwest Territory, Samuel Wolden Parsons, John Armstrong and James Mitchell Varnam. Mr. Armstrong declined the appointment and on the nineteenth day of February, 1788, John Cleves Symmes was chosen in his place. The salary of the judges was fixed at eight hundred dollars per year. This organization of the court continued, with various changes which were made in the appointment of the judges, until the organization of the State of Ohio, in the year 1802.

Under the first constitution of Ohio, the number of supreme judges was three, with power vested in the General Assembly to authorize the selection of one additional judge.

Their term of office was fixed at seven years and their salaries were not to exceed one thousand dollars per annum, each. These judges, under the constitution, were to be chosen by the General Assembly, and on the second day of April, 1803, they elected Samuel Huntington, Return Jonathan Meigs, Jr., and William Spriggs, who composed the first Supreme Court of Ohio. Under this new constitution the first court was organized which concerned Hancock County directly. This was known as the Court of Common Pleas. The constitution of 1802 provided that the several Courts of Common Pleas should consist of a president judge and associate judges; that the State should be divided by law into three circuits and that there should be appointed a president of the Courts, who during his continuance in office should reside therein; that there should be appointed in each county not more than three nor less than two associate judges, who during their continuance in office should reside in the county, and the president in the circuit and the associate judges in the county should constitute the Court of Common Pleas, which court was to have common law and chancery jurisdiction. The several judges under this provision of the constitution were elected by the General Assembly.

The composition of this court was very often criticised and sometimes spoken of as "a court of one hundred judges,"—that is, one judge and two ciphers. In jury cases, undoubtedly the associate judges, who were not men skilled in the law, were practically ciphers, but in the trial of causes to the court they brought to the aid of the presiding judge good common sense and business knowledge, which was often an invaluable assistance and aided in making the finding of the court much more satisfactory than the verdict of a jury.

The president judge of the Common Pleas Court travelled from county to county in his circuit holding court. It was the custom of leading lawyers in those days to travel over the circuits of the several counties with the judges. Before the days of railroads, their ordinary mode of travel was on horseback, and usually each one owned his own horse. The court, bar, and friends journeyed together and generally put up at the same tavern. These leading and traveling lawyers had many partners, usually one in each county seat, who looked after the local business during the interim and was assisted in the trial of cases by the other, who by his constant attendance in court, became especially proficient in the trial of cases.

On horseback, therefore, with books, briefs and clothing stored in saddle-bags, which were thrown over the backs of the horses, the lawyers in merry parties traveled from court to court over corduroy or mud roads. The legs of the riders were encased from the ankles to far above the knee in leggings of stout cloth, the material of which was soon unrecognizable, being encrusted with an inch or more of mud. The way was cheered by story and jest and the woods resounded with laughter and song. One favorite amusement of these lawyers was to bet on the politics of any rider they might see ahead of them in the woods. They would then overtake him and engage in conversation with him, thus deciding the wager. As the party neared a town, one of them was sent ahead to engage rooms and to order a good meal prepared. The coming of a court to town was an event in those days. In the evening judges and lawyers gathered around the huge fireplace of the tavern and told stories until a late hour.

When Hancock became a separate and distinct county, three of her citizens were honored with the appointment of Associate Judges, namely: Abraham Huff, Robert McKinnis and Ebenezer Wilson. We find the record of their first meeting, or the first court held in the county: "At a special court begun and held in the town of Findlay on the 14th of March, in the year of our Lord, one thousand, eight hundred and twenty-eight, present, Honorables Abraham Huff, Robert McKinnis and Ebenezer Wilson, Judges of and for the county of Hancock, and State of Ohio, and proceeded to appoint a clerk, pro tem., and after consideration, appointed Wilson Vance, and gave him the following certificate of his appointment in the following words, to-wit: 'Know all men by these presents, that we, Abraham Huff, Robert McKinnis and Ebenezer Wilson, Associate Judges, in and for the county of Hancock, have this day met at the schoolhouse in the town of Findlay, in said county, and after consultation and deliberation, have proceeded to appoint by living voice, Wilson Vance, Esq., of said county, clerk protem., at Findlay, this 14th day of March, 1828.'

ABRAHAM HUFF,
ROBERT MCKINNIS,
EBENEZER WILSON,
Associate Judges.

"The vote stood, ayes two, nays one. Mr. Vance was sworn into office by Judge McKinnis."

The office of clerk, was held by Mr. Vance as clerk pro tem., under the provisions of Sec. 7, Art. 3, of the Constitution of 1802, which recited: "That each Court shall appoint its own Clerk, for the term of seven years, but no person shall be appointed Clerk except pro-tempore, who shall not produce to the Court appointing him a certificate from a majority of the Judges of the Supreme Court, that they judge him to be well qualified to execute the duties of the office of Clerk to any Court of the same dignity, with that for which he offers himself."

The first judicial officers of the county deserve more than a passing notice, from their fidelity to business, their fairness in the discharge of their duties, and their unsullied character as men.

Judge Robert McKinnis was born in Butler County, Pennsylvania, and was of Scotch-Irish descent. He removed thence to Ross County, Ohio, and from thence, in 1822, he came to Hancock County, where he at once became one of the leading men. He married before his emigration to Ohio, and was surrounded by a grown up family when he came to this county. Not only was the Judge himself a noted man, but his sons, of whom there were four, Charles, Philip, James and John, were men who were trusted by the early settlers with positions of responsibility, which positions were always filled with intelligence and honesty. Charles was one of the first commissioners of the county, a position which at that time, was one of peculiar importance. The affairs of a new county were to be put in shape, all the conflicting interests of rival settlements to be harmonized, public buildings and public business were to be looked after. To safely and successfully manage, and control all these with economy, and to the best interests of a poor struggling population, required discrimination, decision and patience. Mr. McKinnis did not fail in these qualifications. Judge McKinnis was the owner of a good farm in Liberty Township, on the south bank of the Blanchard, and lived to enjoy the fruits of his toil. In after life, and when quite advanced in years, he made several trips to the far west, some of his children having removed there, going and returning alone in his wagon. He died at a ripe old age, loved and respected by all who had his acquaintance.

Judge Ebenezer Wilson came to the county in 1826, and settled in Liberty Township, on a farm on which his son Joseph afterwards resided, where he continued his residence until his death. Of the Judge, it can be said that as a man, he enjoyed the respect and confidence of his neighbors to an unlimited extent. That he filled the office of Associate Judge, with intelligence and honesty, is evidenced by the fact that he held it for two terms—fourteen years—a greater length of time than did any other. The Judge was one of the pioneers of the Presbyterian church, and was noted for his exemplary life. He had a large family of children, who like himself, were social, good natured people. The Judge lived long enough to reclaim from the wilderness, and enjoy the blessings of one of the handsomest farms in the county and to see those who had come into the wilds of the county with him, peaceably enjoy the fruit of their labor, and he had the good fortune to retain to the last the esteem and friendship of his old pioneer associates.

It is not known at just what time Judge Abraham Huff came to the county, but it was at a very early period in its history. There seems to be but little known of his history, except that he was an honorable, straight-forward man, of good strong common sense, and was an upright, intelligent Judge. He was a man of poor bodily health, and left the county at an early day, going to the State of Missouri, in hopes of regaining his health, in which he partially succeeded.

The following is a complete record of the term of the first Court of Common Pleas held in the county, which was the June term in 1828:

At a Court of Common Pleas begun and held in the town of Findlay, in and for the county of Hancock, in the State of Ohio, on the third day of June, in the year of our Lord eighteen hundred and twenty-eight. Present, the Associate Judges, Abraham Huff, Robert McKinnis and Ebenezer Wilson, the Presiding Judge not being present. Don Alonzo Hamlin, Sheriff, Wilson Vance, Clerk pro-tem., Anthony Casad was appointed by the Court to prosecute the Pleas in behalf of the State, for said county for the term of one year, and to be allowed forty dollars for his services."

"Elijah T. Davis was appointed Administrator on the effects of Thomas Wilson, late of Findlay Township, deceased. Joshua Hedges and Squire Carlin were accepted as his sureties, bonds given in the sum of Five Hundred dollars. Joshua Hedges, Jacob Poe and Charles McKinnis were appointed appraisers of said effects. On application ordered that the citizens of Welfare (now Delaware) Township have leave to elect one justice of the peace. One justice of the peace was appointed for Amanda Township. The Court appointed Wilson Vance recorder of Hancock County for the term of seven years, and the Court adjourned without day.

ABRAHAM HUFF."

The first Grand Jury was composed of the following named persons: Josepy DeWitt, John P. Hamilton, Jacob Poe, Asa Lake, Charles McKinnis, Reuben Hales, Mordica Hammond, William Wade, John Boyd, Henry George, William Moreland, James McKinnis, William Taylor, Edwin S. Jones and John C. Wickham. The foreman was William Taylor.

The first Petit Jury summoned was as follows: John Beard, Joseph Johnson, John Huff, William Moreland, Jr., John Tullis, John J. Hendricks, Thomas Thompson, James Pettis, and there being no business for a Jury they were discharged without filling the panel. Rachel Wilson was appointed guardian of Rebecca and Jane Wilson, minor children of Thomas Wilson, deceased. Rebecca was eight and Jane one year old. When grown up Rebecca became the wife of John Reed, of Liberty Township, and Jane the wife of George L. Poe, of Allen Township.

On application, a license was granted to William Taylor to vend merchandise at his residence in Findlay, until the first day of April next, he to pay into the treasury two dollars and twenty-five cents for said license.

At the November term of the Court it "Appearing that there was no business before the Grand Jury, they were discharged." At the same term William Taylor was appointed Surveyor of the county, and the Clerk ordered to certify the same to the Governor. William Taylor, William Hackney and Mordica Hammond were appointed examiners of common schools. It was "ordered by the Court that there be allowed to the Clerk of the Court the sum of ten dollars each year, to be paid one half at each term of Court." Seven years Clerk of the Court for the magnificent sum of seventy dollars.

A special session of the court was held on the 19th day of March, 1829, for the purpose of granting letters of administration on the estate of John Patterson. William Taylor was appointed. Mr. Patterson was a brother of the wife of Mr. Taylor.

At the April term, 1829, Judges Huff, Wilson and McKinnis were present, also Sheriff John C. Wickham, Clerk Wilson Vance and Prosecuting Attorney Anthony Casad. The Grand Jury, the second one called and empaneled in the county was as follows: Robert Long, Amos Beard, Thomas Cole, John Shoemaker, Reuben W. Hamblin, Samuel Sargeant, William J. Greer, Robert Elder, John Hunter, Isaac Johnston, Nathan Frakes, Reuben Hales, Jacob Foster, William Moreland, Jr., Nathan Williams. The foreman was William J. Greer. Due notice having been given, William Taylor was licensed to keep a tavern at his house in Findlay, by paying five dollars. The Grand Jury, at this session, found a bill of indictment —the first ever returned in the county.

The first case on the civil docket was that of Robert Elder and wife against Asa Lake and wife for slander. Damages claimed, five hundred dollars. The action was brought at the November term, 1828, Abel Rawson, plaintiff's Attorney. A judgment was rendered for the defendants, and the plaintiffs ordered to pay the costs, taxed at two dollars and twenty-two cents. Such a cost bill as that would not go very far towards paying the costs of a slander suit in these days, neither would it make the officers of the court either rich or happy.

The case of Henry McWhorter against Samuel Sargeant and Abraham Huff was tried at the April term, 1830, before Ebenezer Lane, President Judge, and Judges Wilson and McKinnis, associates. The action was upon note of hand, and amount claimed four hundred dollars, and one hundred dollars damages. "Now comes the plaintiff by Mr. Godman, his attorney, and the defendant being three times solemnly called came not, but made default. It is therefore considered that the plaintiff recover of said defendants the sum of $237.83, his debt aforesaid, together with his damages assessed by the court at one cent, and his costs of suit to be taxed at $3.30.

The case of the State of Ohio against Thomas Slight was tried before a jury composed of Joshua Hedges, Vanrensalear Hancock, John Elder, Seldon Blodgett, Sampson Dildine, James McKinnis, William DeWitt, Josiah Elder, Thomas F. Johnson, Asa M. Lake, Asa Lake and Mathew Reighly. Verdict, guilty. Second trial allowed, case finally dismissed.

Perhaps no cases tried in the county excited more interest at the time than those in which John P. Hamilton and Charles and Philip McKinnis figured. Charles McKinnis and John P. Hamilton were both county commissioners, and a petition had been presented to the Board, praying for the division of Findlay Township which then included all the western part of the county. To this proposition McKinnis, and perhaps his immediate constituency, were opposed, as it struck them off from Findlay. At the session in which the matter was to be determined, McKinnis after coming to town was attacked with the ague, and consequently was not able to meet with the Board. In his absence Hamilton and the other commissioner passed the act dividing the township. This was done no doubt without any intention of showing discourtesy to McKinnis, but it seems that McKinnis did not so regard it, for when the matter came to his ears, he was greatly enraged, as he believed they had purposely taken advantage of his absence to pass the obnoxious order. As soon as he was able to be on the street, meeting Hamilton, whom he considered as the prime mover in the matter, he attacked him and gave him a severe beating. Philip McKinnis happening to come to town and hearing that his brother Charles and Hamilton had been in a fight, and knowing that Charles was sick, took it for granted that his brother had been worsted in the fight. In his impetuous manner, he started out to find the man whom he supposed had taken an undue advantage and meeting Hamilton, without further ceremony pitched into him and repeated the dose which Charles had administered. Thus by mistake Hamilton got two beatings, for had Philip known that Charles had come out first best in the fight, or even that he had been the aggressor, and got whipped in a fair fight, he would not have interfered. The matter came before the courts and bills of indictments were found by the Grand Jury. The record says that to the indictment "the defendants say they are guilty, and threw themselves on the mercy of the court." The sentence pronounced by the court against Charles McKinnis was "that said McKinnis pay a fine of one dollar, and the costs of suit, taxed $2.24, and that he stand charged until the sentence of the court is complied with and be in mercy." The case against Philip was disposed of in the same way.

John P. Hamilton, in September, 1829, by T. C. Powell, his attorney, brought suit against Charles McKinnis for damages sustained by him in the assault and battery, claiming five hundred dollars damage. The case was tried to a jury composed as follows: Joshua Elder, Don Alonzo Hamblin, Robert L. Strother, Joseph Egbert, Joshua Powell, Nathan Williams, William Greer, John J. Hendrichs, Mordica Hammond, Peter George, Thomas Thompson and William Morehead. Verdict, guilty. Damages assessed at seventy-five dollars. Suit was also brought against Phillip McKinnis, and a judgment of thirty-five dollars was recovered.

Anthony Casad, of Bellefontaine, Ohio, was appointed prosecuting attorney of the county at the magnificent sum of forty dollars a year. Among the names of attorneys practicing in the courts in that day, and for many years subsequently, we find those of Casad, Godman, Powell, Goit, Hall, Bates, Morrison, O'Neal, Coffinberry, Patterson, May and Rawson. In 1835, Robert L. Strother and John W. Baldwin were appointed Associate Judges, in place of Huff and McKinnis, Judge Wilson being reappointed. Judge Baldwin held the office but a short time, and upon his resignation, Major Bright was appointed.

In 1842, John Ewing, Mordica Hammond and William Roller were appointed, and they were succeeded by Michael Price, John Cooper and Gamaliel C. Brandel, and with them the race of associate judges became extinct, as the Constitution of 1851 abolished the office. The people of the county were very fortunate in the appointment of judges, as all were, at least, of the best citizens of the county.

Edson Goit, the first resident lawyer of Findlay, was born in Oswego County, New York, October 18, 1808. When he was quite small his father died, but, through improving every opportunity during his boyhood years he managed to obtain a fair education and taught school ere reaching his majority. In 1827 he left his early home and traveled across Ohio until arriving at the village of Fremont. Here he halted and subsequently taught school in Fremont and Tiffin. During this period Mr. Goit read law under Rudolphus Dickinson, of Fremont, and Abel Rawson, of Tiffin, and July 12, 1832, was admitted to practice. Learning that Findlay, the then new county seat of Hancock County, had no lawyer he at once concluded to come here and cast in his fortunes with the then hamlet. Traveling on foot from Tiffin, he reached Findlay on the third day of his journey and went to reside in the home of Dr. Rawson, a practicing physician of the village. This was in August, 1832, and in September he was appointed prosecuting attorney, which position he held until June, 1836. The office of prosecuting attorney, however, paid a very small salary during this period of the county's history, and for several months after settling in Findlay Mr. Goit patiently waited for clients that never came. Discouraged at the poor outlook, he at last made up his mind to leave the town, but ere he had carried out his intention the tide turned and he was engaged to teach a school, being thus guaranteed sufficient to pay his board. Clients soon began to consult him, hope took the place of despondency and he gave up the idea of leaving Findlay. While boarding at the tavern of William Taylor in 1835, he married Miss Jane Patterson, a sister of Mrs. Taylor, with whom she was living. In May, 1836, Mr. Goit was appointed auditor, vice John C. Schnnon, deceased, and served till March, 1837. In April, 1837, he was again appointed prosecuting attorney, but resigned the office in October, 1838. The same month he was elected treasurer and filled that office two successive terms. Besides attending to the duties of his profession he now launched out boldly into other pursuits. He accumulated a large amount of land and engaged extensively in mercantile business in Hancock, Allen and Putnam Counties. He, however, got too many irons in the fire; his business was too complex for judicious management, and his large land interests finally became an incumbrance and proved his financial downfall. From January, 1858, to January, 1862, he again filled the office of prosecuting attorney and this finished his official career. Mr. Goit possessed unbounded energy and though a fair lawyer, did not devote sufficient attention to his profession to keep up with the times. He was a man of fine personal appearance and dignified carriage, and was regarded as a very strong jury lawyer. Though he lost the fruits of a lifetime of persevering industry he did not, however, "fail" as that term is commonly understood, but paid his creditors to the last penny, no man losing a cent by him, and his every promise being faithfully redeemed. Such was his sterling honesty that his principal solace at the hour of his death was the fact that he owed no man a dollar. His first wife died in the spring of 1863, leaving a family of three sons and one daughter. One of the sons was subsequently killed in the War of the Rebellion. Mr. Goit was afterwards married to Mrs. Sarah A. McConnell, of Van Buren, and in the fall of 1867 removed to Bowling Green, where he died May 29, 1880. Two daughters were born of the second marriage, both of whom are dead. No man has ever lived in Findlay who is more kindly remembered than Edson Goit. He was charitable to a fault and every worthy public enterprise found in him a warm friend and generous support. Mr. Goit built while living in Findlay what was then the largest block in Findlay. The Karg Bros. meat-market block is a portion of the building he erected, although the entire structure was remodeled during the boom.

Arnold F. Merriam was the second lawyer to locate in Findlay. He was born in Brandon, Vt., December 17, 1811, and was there educated and began the study of law. In early manhood he removed to Zanesville, Ohio, where he completed his law studies and was admitted to practice. He soon afterward started for Vinton County, where he intended to locate. During his journey he met Wilson Vance, who induced him to change his mind and come to Findlay. He arrived here in the spring of 1835 and entered into partnership with Edson Goit. In June, 1836, he was appointed prosecuting attorney, which office he filled till April, 1837, when he resigned. On the 27th of May, 1837, he married Miss Sarah A. Baldwin, who bore him one son and two daughters. In January, 1838, Mr. Merriam started the Hancock Republican, the first Whig paper published in the county, which he published about a year. He then removed to Mansfield, Ohio, sold the press and subsequently went to Kentucky where he died in July, 1844. His widow returned with her family to Findlay, and afterward married Judge Robert Strother. The lady lived here for some few years, the venerable Mrs. S. A. Strother, whom everybody loved and revered.

John H. Morrison, the third lawyer who came to Findlay, was one of the best known members of the pioneer bar. P. B. Morrison and the Misses Morrison of this city, one of whom is now dead, were son and daughters of the once celebrated lawyer. He was born in Uniontown, Penn., in 1802, but removed when quite young to Perry County, Ohio, where at the age of fifteen he lost his right arm by accident. Young Morrison received a good common school education, read law in the office of Philemon Beecher, of Lancaster, Ohio, began practice in Bucyrus, and afterwards filled the office of prosecuting attorney and treasurer of Crawford County. In the fall of 1836 he located in Findlay and soon became well known throughout northwestern Ohio. Mr. Morrison was married in Perry County, Ohio, to a Miss Henthorn, who died at Bucyrus without issue. He afterwards married in Perry County, Ohio, a Miss Henthorn, who died at Bucyrus, without issue. Subsequent to this second bereavement, he married Miss Nancy Williams, who reared a family of five children, two of whom still reside in Findlay. He died April 19, 1864.

Jacob Barnd was a bright, promising, young lawyer, who died in 1845. He was a native of Perry County, Ohio, and a son of Christian Barnd, a pioneer of 1831, in which year he removed with his parents to this county. In 1832 the family moved from the farm into Findlay where Jacob afterward studied law under Edson Goit. He was admitted to the bar in 1837 and in October, 1838, was appointed prosecuting attorney, but served only until the end of the term of court, which was October 9, 1838. He filled the recorder's office two terms, from October, 1838, to October, 1844, and it is probable that he did not practice much during that period. He left two sons at his death.

Jude Hall came to Findlay about 1836, where he followed the carpenter's trade, and sometimes preached the gospel. He was a queer specimen of the genus homo and quite an eccentric character. He read law with Edson Goit and soon after his admission to the bar in 1838 he was elected prosecuting attorney, being re-elected in 1840. In 1843 he removed to Defiance and thence to Upper Sandusky, where further trace of him was lost.

Hon. Charles W. O'Neal comes next in the order of time. He was born in Middletown, Frederick County, Maryland, January 18, 1811, and in 1833 removed to Zanesville, Ohio, where the following year he was married to Miss Amy J. Baldwin. In July, 1835, he came to Findlay and began the study of law in the office of Goit and Merriam and in August, 1838, was admitted to practice. Mr. O'Neal was a practical surveyor and did a great deal of surveying in this county. He was also one of the pioneer school teachers of Findlay. In 1836 he was elected auditor serving one term, and he also represented this district in the State Senate from 1844 to 1846. He practiced his profession in Hancock County nearly forty years, retiring from active practice a few years prior to his death, and removing to Indiana, whence he returned and died in Findlay, December 20, 1879. Mr. O'Neal, though a safe counsellor, was not an advocate and rarely appeared in that capacity in any important case. He was very methodical and dignified in his practice, terse and forcible in argument and always courteous to the opposing counsel. He was close and economical in his business habits and very successful in the accumulation of wealth, leaving to his descendants a handsome fortune.

Abel F. Parker was born in Cavendish, Windsor County, Vermont, May 11, 1800, and died in Findlay, May 31, 1881, in his eighty-second year. In early manhood he settled in Genesee County, New York, where he removed with his family to Blanchard Township, this county, two years later locating in Findlay. He read law under Edson Goit and was admitted to the bar in 1842. The same year he was elected prosecuting attorney and served one term. In 1846 he was again elected prosecutor and re-elected in 1848, but resigned the office in 1849. Mr. Parker also filled the office of postmaster of Findlay. His first wife died in 1848, leaving a family of one son and two daughters. In 1852 Mr. Parker married Sarah A. Robinson, who bore him two sons and one daughter. His two daughters, Misses Julia and Dora, resided in this city many years, and his son, Judge Robert Parker, resided in Bowling Green. Though Mr. Parker lived to the ripe old age of more than four score years, he nevertheless continued in practice up to within a short period of his decease. He loved his profession and was highly respected by his associates of the bar.

Ezra Brown was born in Lown, Canada, August 4, 1814, and when about three years old removed with his parents to what is now the town of Albion, Orleans County, New York. There he resided till October, 1839, when he came to Findlay. Entering the law office of John H. Morrison, he was admitted to the bar in July, 1842. He formed a partnership with his preceptor and continued in practice until February, 1847, then removed to a farm in Wood County, near Fostoria. In the spring of 1852 Mr. Brown returned to Findlay, and resumed the practice of his profession. He remained in practice till the fall of 1880 and then retired from the active duties thereof. In the spring of 1885 Mr. Brown was elected justice of the peace, which office he held until his death, some time later. He was mayor of Findlay and a member of the council. On the 11th of November, 1845, he married Miss Jane E. Biglow, who died February 4, 1873, leaving a family of two daughters, Miss Metta, who was a teacher in the schools in Portland, Oregon, and Mrs. S. P. DeWolf, wife of the ex-county auditor and manager of the Findlay Morning Republican. A son died at Memphis, Tenn., in 1863, while serving the Union Army.

Elijah Williams was also a student in the office of Mr. Morrison and was admitted with Ezra Brown in July, 1842. He practiced in Findlay about eight years, when he removed to Portland, Oregon, where he died a few years ago. He is remembered as a sharp, shrewd, but diffident lawyer.

Hon. Machias C. Whiteley was born May 24, 1822, and died several years previous to 1901. He came of Scotch-Irish parentage and was born at East New Market, Dorchester County, Md. His paternal grandfather was a patriot of the Revolution and his father served in the War of 1812 against the British. In

1832 his parents, Willis and Elizabeth Whiteley, removed their family to Baltimore, Fairfield County, where the subject of this sketch worked on a farm and attended the common schools of the neighborhood. He subsequently learned the harness trade, which he followed until coming to Findlay in 1840. For two years he worked in the clerk's office, devoting his spare time to reading law with Goit & O'Neal and then returned to Fairfield County, where he continued his law studies with Medill & Whitman, of Lancaster. On the 4th of July, 1843, he was admitted to the bar at Tiffin and immediately opened a law office in Findlay where he gradually attained a lucrative practice. In 1847 Mr. Whiteley married Miss Sarah A. Henderson, a native of Wayne County, Ohio, and daughter of William L. Henderson, a leading surveyor of Hancock County, and one of its earliest settlers. Nine children were born to this union. In 1848 Mr. Whiteley was elected to the legislature and re-elected in 1849. While in the legislature he took part in the election of Salmon P. Chase to the United States Senate and secured the charter of the Pittsburg, Ft. Wayne and Chicago Railroad. In 1856 he was a delegate to the Democratic National Convention which nominated Buchanan and Breckenridge for president and vice-president of the United States. The same fall he was elected judge of the court of Common Pleas, for the Third Subdivision of the Ninth Judicial District, and was re-elected in 1861, serving on the bench ten years. In 1864 Judge Whiteley was nominated on the Democratic ticket for supreme judge, but with the balance of the ticket was defeated, the state going largely Republican that year. Upon retiring from the bench in 1867 Judge Whiteley resumed practice in Findlay and continued in active practice almost up to the time of his death. He was one of the most prominent attorneys of northwestern Ohio and a Democrat of Democrats, but absolutely refused to vote when the registration law went into effect.

William M. Patterson was admitted to the bar at Tiffin July 4, 1843, on the same day as Mr. Whiteley. He was born in Harrison County, Ohio, March 24, 1812, and in the spring of 1834 came to Findlay with his parents, Major John and Elizabeth Patterson. He read law with Charles W. O'Neal and upon his admission began practice in Findlay. In 1844 he was elected prosecuting attorney and served one term. He was married in 1834 to Susan Amspoker and resided in Findlay till 1854, when, with his wife and four children, he removed to Kansas. He died in the spring of 1858 from the effects of an accident caused by a boiler explosion in the fall of 1855 in a saw-mill which he was then operating.

Hon. James M. Coffinberry became a member of the Findlay bar in the fall of 1845. He was born in Mansfield, Ohio, May 16, 1818, whence in 1836 his father, Andrew Coffinberry, removed to Perrysburg, Wood County. Here James M. read law in his father's office and in 1840 was admitted to the bar. His father, widely known as Count Coffinberry, was one of the leading attorneys of Northwestern Ohio and practiced in this portion of the state throughout the earlier years of its history. Soon after admission to the bar James M. opened a law office in Maumee City and subsequently served as prosecuting attorney of Lucas County. Late in the fall of 1845 he settled in Findlay where he purchased an interest and took editorial charge of the Findlay Herald, the local organ of the Whig party. In the spring of 1846 he became sole owner of the

Herald, which he published about three years, and then sold out to Dr. David Patton. From the date of his coming to Findlay Judge Coffinberry took and retained a leading position at the Hancock County Bar and in 1852 was a prime mover in the establishment of the Findlay Bank, the first financial institution established in the county. Feeling the need of a large field for the full exercise of his maturer powers, he removed in 1855 to Cleveland, Ohio, where he held a high rank among the eminent lawyers of that city. In 1861 he was elected on the Union ticket Judge of the Common Pleas Court and served five years on the bench. Upon the expiration of his judicial term he resumed his professional duties and continued in the enjoyment of a large and lucrative practice till 1875 when he retired. He was one of the greatest lawyers Findlay ever had.

Charles S. Coffinberry, a younger brother of the Judge, practiced law in Findlay about three years. He was a native of Mansfield, Ohio, born February 1, 1824. He read law with his father at Perrysburg and came to Findlay in the spring of 1846, where he formed a partnership with John M. Morrison. In 1849, in company with others from this portion of Ohio, he went to California and was afterward appointed by President Filmore to take the first census of that state. In the discharge of this laborious undertaking, he was ably assisted by his father, who had followed him to the new Eldorado. He finally returned to Ohio and for a few months was associated with his brother in the practice of the law in Cleveland, but failing health compelled him to again relinquish his professional labors and he went to Oregon and New Mexico where he spent the later years of his life, dying of consumption about thirty miles south of Pueblo, December 17, 1873.

Aaron H. Biglow was a native of Vermont and a graduate of Middlebury College. He there read law and was admitted to practice. In July, 1841, he located in Findlay and for a few years was engaged in mercantile pursuits. He then began the practice of law, which he followed until 1856 when he gave up the profession and subsequently removed to Indiana, where he died. Mr. Biglow possessed a good education and was a fair speaker, but never acquired much practice.

John E. Rosette first located in Mt .Blanchard where he married. In 1848 he removed to Findlay and in April, 1849, he was appointed prosecuting attorney, vice Abel F. Parker, resigned. He was twice elected to the same position, serving until January, 1854. He was modest, quiet, and of studious habits, possessing good legal judgment but diffident and lacking self-reliance. Soon after the expiration of his last term as prosecutor he removed to Springfield, Ill., where he rapidly secured recognition as a sound, reliable lawyer. He was appointed by President Johnson United States district attorney for the southern district of Illinois. For some years before his death he enjoyed a wide reputation as a criminal lawyer and commanded the confidence of a bar embracing many distinguished men.

Henry Brown was one of the oldest and best known members of the bar. He was born in Albion, Orleans County, N. Y., November 25, 1826, and received a good literary and classical education at the Albion Academy. In May, 1844, he came to Ohio and engaged in school teaching near Fostoria, which vocation he followed three years. During this period he commenced the study of law under Hon. Warren P. Noble, of Tiffin, Ohio, and in the fall of 1848 he was admitted to practice. In January, 1842, he located in Findlay as a member of the law firm of Goit, Biglow & Brown. In January, 1851, Mr. Brown bcame one of the editors and proprietors of the Hancock Courier, which he continued to publish until January, 1854. When he sold his interest to his partner Aaron Blackford, who had also been his law partner for the last two years. In January, 1855, he assumed entire editorial control of the Courier and carried on that paper until December 20, 1856. He was elected auditor in October, 1854, and served till March, 1857. Mr. Brown was then compelled by ill health to retire from active business. After a period of needed recuperation he resumed the practice of his profession and in November, 1862, was appointed prosecuting attorney to serve out the unexpired term of James A. Bope, resigned; was elected as his own successor, and re-elected to the same position. In 1868 he was the Democratic senatorial candidate for election in this district, and made a splendid race, reducing the previous Republican majority 1,973 votes, and being defeated by only 227 votes. Mr. Brown was again elected prosecutor in 1875 and re-elected in 1877. In 1884 he was once more chosen to fill the same office and in 1887 was elected to the lower house of the legislature, succeeding himself in 1889. He died May 11, 1893, regretted by all who knew him.

William Gribben was one of the brightest, brainiest members of the Findlay bar and might have risen very high if he had devoted his talents to his profession. He was born in Allegheny County, Penn., March 11, 1825, and in the following autumn his parents removed to what is now Ashland County, Ohio, where Mr. Gribben grew to maturity and received a common school education. He read law with Johnson and Sloan of Ashland and was admitted to the bar in the fall of 1850. The same autumn he located in Findlay and formed a partnership with John H. Morrison and subsequently with Judge Whiteley. In 1853 he was elected prosecuting attorney and was re-elected in 1855. He served in the legislature from 1862 to 1864 and received the certificate of re-election but lost the seat on contest. This was during the most exciting period in the political history of the state, when Democrats were publicly branded as rebels and political passion ran high. Mr. Gribben followed his profession until his death, which occurred November 28, 1887.

Aaron Blackford was one of the oldest and most prominent members of the Hancock County bar, to which he had belonged nearly fifty years. He was born in Columbiana County, Ohio, February 8, 1827, and removed to Findlay with his parents, Price and Abigail Blackford, in October, 1834. He received his education in the public schools of Findlay and at Delaware College, Delaware, Ohio. He read law with Henry Brown, of Findlay, attended the Cincinnati Law School and was admitted to the bar in May, 1852. In January, 1851, he became associated with Henry Brown, of Findlay, in the publication of the Hancock Courier, which they jointly edited until January, 1854, when Mr. Blackford became sole editor. He conducted the paper about one year and then disposed of his interest to his former partner. During this period Mr. Blackford also practiced law, and with the passing years attained more than a state prominence in his profession. Mr. Blackford was the Nestor of the Findlay bar and accumulated great wealth. He had four sons, two of whom are now practicing attorneys in this city—Rollin dying a few years ago, the two still practicing here being Frank P. and Charles A. Blackford. Mr. Blackford died Dec. 7, 1904.

Hon. William Mungen was born in Baltimore, Md., May 12, 1821, and died September 9, 1887. He removed with his family in 1830 to Carroll County, Ohio, where he received a common school education and subsequently studied Latin, German and the physical sciences. He came to Findlay in October, 1842. In February, 1845, he took possession of the Hancock Farmer, and changed its name to the Hancock Democrat and on the first of July, 1845, he became the editor and proprietor of the Hancock Courier, consolidating the two papers. Excepting one year during which the office was rented to William M. Case, and a short period to B. F. Rosenberg, Mr. Mungen published the Courier until 1851, when he sold the establishment to Henry Brown and Aaron Blackford, two leading members of the bar. In 1846 Mr. Mungen was elected auditor of Hancock County and re-elected in 1848. In 1846 Mr. Mungen was chosen to represent this district in the state senate and declined a renomination, which was then equal to election. In the meantime he had been reading law during his spare moments and in 1852 was admitted to the bar and began practice. When the Rebellion broke out in 1861 Mr. Mungen was foremost in recruiting the Fifty-seventh Ohio Volunteer Infantry and was commissioned colonel of that gallant regiment, which he commanded until April, 1863, when he resigned the commission. Colonel Mungen served as a Democrat two terms in Congress from 1867 to 1871. He is the only congressman Hancock County had then had. Mrs. Jacob H. Boger and Miss Effie Mungen of this city are his daughters. Mr. Mungen was a true patriot, a noble citizen, a great lawyer and a brave soldier, serving in any capacity in which his country's cause was prime motive.

Andrew Coffinberry was conspicuous among the old-time lawyers of the Maumee Valley, and though not a resident of Findlay until within a few years prior to his death, he practiced at this bar before the county possessed a single attorney. He was born at Martinsburg, Berkeley County, Virginia, August 20, 1788. In the spring of 1836 he removed with his family to Perrysburg, Wood County, Ohio, where he resided until 1849-50. From Perrysburg he removed to Sidney, Shelby County, Ohio; there he left his family and went to California. Upon the death of his wife, which occurred during his absence, his son James M. brought the family to Findlay, where their father joined them on his return from California. Here he continued in practice until his death, May 11, 1856. "Count" Coffinberry was not only a lawyer of ability but possessed considerable literary talent. "The Forest Ranges," a descriptive poem, was one of his productions. His sobriquet of "Count" was first playfully given him by his professional associates from some real or supposed resemblance to the illustrious German jurist and publicist Count Puffendorf. The title was recognized as being so appropriate to the man that it stuck to him through life, and thousands of those who knew him long and well never knew that it was not his real name.

John F. Caples came to Findlay from Fostoria in the fall of 1854 and practiced law here till the spring of 1858, when he removed to Warsaw, Indiana. He subsequently went to Portland, Oregon, and entered into the practice of his profession. "John F. Caples," said Judge Coffinberry, "is one of the best lawyers of his adopted state." During his life in Findlay he was recognized as a good speaker and a promising young lawyer.

Daniel B. Beardsley, one of the pioneers of Hancock County and a lawyer for many years in Findlay, was born in Licking County, Ohio, May 12, 1832, and was brought by his parents to Hancock County in 1834, where he resided until his death September 29, 1894. Mr. Beardsley was educated in the public schools of this county and taught school for a number of years. He read law with Walker & West, of Bellefontaine, and was there admitted to the bar in August, 1856. In March, 1857, he located in practice in Findlay and for thirty-seven years was a member of the local bar. In 1858 he was elected a justice of the peace of Findlay Township and was re-elected eight times, serving continuously from the spring of 1858 to the spring of 1885, a period of twenty-seven years. Mr. Beardsley was prominent in the organization of "The Hancock County Pioneer and Historical Association" and an active member during its existence. His connection with this society prompted him to write a history of Hancock County which he published in 1881. Mr. Beardsley was also secretary of the Hancock County Agricultural Society for many years and he was a good one—an untiring worker and a genial courteous gentleman with friends in every nook and corner of the county.

William C. Bunts located in Findlay in the spring of 1858, whither he removed from Youngstown, Ohio. He graduated in 1854 from Allegheny College at Meadville, Penn., read law with Ridgeley Powers, of Youngstown, and upon admission began practice with his preceptor. Mr. Bunts practiced law in Findlay till 1860 and then returned to Youngstown and resumed partnership with Mr. Powers. He afterwards served in the Civil War, on the staff of General Rosecrans. He located at Nashville, Tenn., subsequently returning to Youngstown and thence going to Cleveland, where he filled the position of assistant United States district attorney and city solicitor, dying January 16, 1874.

Col. James A. Bope was a native of Ohio, having been born in Winchester, Adams County, on the 30th of November, 1833. His parents removed to Lancaster in 1838 and there he received his preliminary educational discipline, after which he was matriculated in Wittenberg College, Springfield, Ohio, where he was graduated as a member of the class of 1855. There was no element of vacillation in his nature, and thus it was to be expected that he would early form definite plans as to his course in life. He began reading law in Lancaster, being a close and assiduous student and so rapidly advancing in his technical knowledge as to secure admission to the bar of the state in 1857. He served his novitiate as a practitioner in Lancaster, where he remained until 1859, when he came to Findlay. Here he subsequently maintained his home and by his life and services added to the dignity of the bar of the state.

In 1861 Colonel Bope had been elected prosecuting attorney of the county, but the responsibilities of this incumbency and the demands of his general practice did not deter him from promptly responding to the clarion call to arms when the dark shadow of Civil war obscured the National horizon. In July, 1862, he enlisted as a member of Company D, Ninety-ninth Ohio Volunteer Infantry, of which he was made captain and in which he served until July 10, 1864, when he was appointed acting inspector general in the brigade commanded by Colonel P. T. Swaine. In the battle of Atlanta our subject was severely wounded and was sent home by General Schofield, presumably never to return to the front or even survive his injuries. He, however, recovered and rejoined his command in North Carolina. He was made lieutenant colonel and was placed in command of the Ninety-ninth and Fifteenth Consolidated Regiments of Ohio Volunteer Infantry, in which capacity he served until the close of the war, being mustered out in July, 1865. He was an active participant in all the engagements of his command from Perryville, Ky., to the end, including the battles of Lookout Mountain, Chickamauga and Missionary Ridge, and from Dalton to Atlanta. He had received several minor wounds prior to being incapacitated by his injuries at Atlanta.

After being mustered out Colonel Bope returned to Findlay and resumed his interrupted professional work in which he gained a marked precedence and a representative clientage. For more than a decade he was retained as counsel for the Findlay city council and thereafter served for four years as city solicitor. He devoted his attention principally to corporation law, having nothing in the line of criminal cases in connection with his professional work, though he proved a strong advocate, versatile and thorough and learned in the minutia of the law. He was attorney for a number of important corporations, including leading banking institutions, and attorney for the Cincinnati, Sandusky and Cleveland and the Big Four Railroad and also for the Bowling Green & Southern Traction Company. His political allegiance was given to the Republican party of whose cause he was ever a stalwart supporter and advocate. In 1861 Colonel Bope was united in marriage to Miss Martha J. Meeks, a daughter of Rev. J. A. Meeks, and their home was ever a center of gracious hospitality. Colonel Bope died October 25, 1908.

Absalom P. Byall. Few, if any, of the men living in Hancock County today, have been so closely connected with the progress and official affairs of the county as has the Hon. Absolam P. Byall. Mr. Byall was born in Stark County, Ohio, on the 19th day of June, 1821, and moved with his father's family to Findlay, arriving on the 6th of September, 1833, when a lad of twelve years of age, and has been a continuous citizen of this county to the present day. The family settled on a forty-acre tract of land on the east side of Main Street, extending from Sandusky Street to Lima Street, building a house on the site of the grounds at present occupied by the fine residence of George P. Jones. At that date the land was covered by the primeval forest. Mr. Byall with the help of the subject of our sketch, cleared up this land, making for himself and family a comfortable home. In 1840 the father died, and Absalom being the oldest of five children, took upon himself the dutiful task of the support of his mother and the four younger children.

In September, 1845, he was united in marriage to Miss Sarah A. Youngkin, and to this union were born one son and three daughters, all of which are still living. Mrs. Byall died May 21, 1865, just at the close of the civil war. In 1867 Mr. Byall was again married to Miss Sallie Mavety, and to this marriage were born two children, a daughter, who at the age of two and a half years met with the sad fate of death from drowning by falling into a well, and a son George F. Byall, the well known and progressive agriculturist. His second wife died February 13, 1897, since which time Mr. Byall has remained single, living in his beautiful residence by the most handsome grove in the county, planted by his own hands. In his early life he cleared land, chopped cord wood and did farming, besides attending to different official services that fell to his lot.

In 1842, Elisha Brown of Amanda Township was elected sheriff of Hancock County, but the amount of business in the office not justifying Mr. Brown's removal to Findlay, he appointed A. P. Byall, then a young man of twenty-one, as his deputy, and the business of that office was ably and promptly attended to until the close of Mr. Brown's term. Owing to a split in the Democratic party in 1844, Elisha Brown failed of re-election, the opposite party taking the office; but in 1846, A. P. Byall was nominated and elected to the office of sheriff of Hancock County, which he held for about a year and a half when he resigned to accept an appointment as clerk of the court, as under the constitution of 1802 this was an appointive office by a president and three associate judges. Judge Good, of Shelby County, was president, and Hammond, Roller and Ewing were associates. The last three were residents of this county.

The new Constitution of 1851 terminated the appointment, and made it an elective office, thus terminating Mr. Byall's term. At that time the duties of clerk of the court were not arduous, and Mr. Byall employed his spare time in reading law, with C. W. O'Neal and M. C. Whiteley, and was admitted to practice by Judge Thurman of the Supreme Court of Ohio, his office having terminated by Constitutional limitation in 1852. In 1857 he located on a farm north of town and for a time gave his entire attention to practical farming, in which, as in all other things he engaged in, he was successful, as he put his own hands to the plow and did not look back.

In 1860 he took the census of the west half of the county with the exception of Orange and Van Buren Townships. In 1861 he removed to Findlay for the purpose of better educating his children, and bought the property on the east side of Main Street north of Front Street, built in an early day by Wilson Vance, and now owned by Mrs. Wilhelmina Traucht, and occupied by her for a residence and milliner store. In 1868 he sold this property to Gen. M. B. Walker, and bought a farm on the Lima Road about a mile from Main Street, and after some years built a fine residence and embellished the grounds with groves and shrubbery, until it is one of the handsomest homes in Hancock County.

In 1847 while sheriff, he took a jury of six men along the route of the "Branch Road" from here to Carey, to appraise the lands in anticipation of the building of the railroad from Findlay to Carey, the first railroad built in this county. In 1872 he was elected Justice of the Peace, but finding that it interfered with the work of managing his farms, he resigned after holding the office for a year and a half. In 1873 he was elected a member of the Constitutional Convention that convened in Columbus, O., and held sessions until the breaking out of cholera in August of 1873, when it adjourned and reassembled in Cincinnati December 1st of the same year, and remained there until the 15th of May, 1874.

He was President of the Hancock Agricultural Society for fifteen years, and the society grew strong and prosperous under his management. In 1883 he was elected as a member of the House of the Ohio Legislature, and was reelected in 1885. Here it was that Colonel Byall—for by that name was he known to the members of that body—displayed great strength of character, and many important measures were intrusted to his care in their passage through the House, not only from his own county but from others as well. His well known integrity and steadfastness called forth the confidence in his honesty and influence to carry a bill to a favorable termination in that body.

Col. Byall has a most wonderful memory of events that have occurred in his life, and those of a public nature, and his recital of them is both instructive and entertaining. Hour upon hour can be pleasantly spent in conversation with him at his splendid and commodious home on Lima Avenue. The beautiful "Byall Park," located on the southwest border of the town, at the head of Hurd Avenue, and used as a camp meeting ground, was largely the gift of Mr. Byall and embellished by the society who hold annual meetings is considered an attractive spot, and well deserves to be named in honor of so noble and charitable a gentleman.

Hon. John M. Palmer was born in Clinton County, New York, July 5, 1814, learned the cabinet maker's trade in Portland, Vt., and worked at it in that state. In 1837 he came to Ohio and attended Granville Seminary. He studied law with Hon. Henry Strausberry, of Cincinnati, and was there admitted to practice in 1841. In 1843 he was married at Lancaster, Ohio, to Miss Ellen Weaver, and located in practice at Somerset, Perry County. In 1846 he removed to Defiance, where he followed his profession until 1852 when he was elected judge of the Court of Common Pleas. While still on the bench Judge Palmer removed to Putman County, in which county he had considerable land interests and a township of which was named in his honor. In June, 1858, he settled in Findlay, and resumed the practice of law in partnership with John Maston. From 1861 to 1863 he was a commissary in the army with the rank of captain, but resigning the office, remained in the south for some time. Returning to Findlay he again took up his practice and followed the profession up to the illness which resulted in his death November 29, 1876.

Elijah T. Dunn was born in Knox County, Ohio, June 20, 1840. His father was a farmer and tobacco grower. In 1844 he removed with his people to Wood County, Ohio, in what was then known as the "Black Swamp," where, with three terms of winter school, his early education was finished. At the age of thirteen he entered the office of the Herald of Freedom, at Wilmington and became an expert printer. He taught several terms of school in Clark and Hancock Counties, pursuing in the meantime the study of law. On the breaking out of the Rebellion he joined with the Union army, while yet a minor and did service for a short time as a member of the Twenty-first Ohio Volunteers. Becoming unable to perform duty as a soldier he held for a while a clerkship in the quarter-
turning to Findlay he completed his law course
master's department at Nashville, Tenn. Re-

and on the 2nd of August, 1862, was admitted to the bar. He was then twenty-two years of age. He then settled down in Findlay and has ever since been creditably identified with the legal profession here.

The following is a list of the attorneys, who are practicing their profession in this city:

Axline & Betts, O. A. Ballard, Charles V. Bish, J. C. Bitler, Blackford & Blackford, E. V. Bope, W. F. Brickman, N. W. Bright, Burket & Burket, R. K. Carlin, W. L. Carlin, W. W. Chapman, J. J. Cole, R. D. Cole, R. Clint Cole, S. J. Williams, J. N. Doty, E. T. Dunn, B. L. Dunn, M. G. Foster, Franklin Franks, John Franks, A. G. Fuller, T. F. Gillespie, Alfred Graber, J. M. Harrison, C. E. Jordon, A. E. Kerns, T. W. Lang, Thomas Meehan, G. F. Pendleton, G. H. Phelps, Poe & Poe, J. E. Priddy, G. W. Ross, M. C. Shafer, John Sheridan, John D. Snyder, Hiram Van Campen, B. W. Waltermire, R. J. Wetherald, Albert Zugschwert.

HANCOCK COUNTY BAR ASSOCIATION.

In pursuance to a call which had been circulated among the attorneys of Findlay, upwards of thirty members of the legal fraternity met at 4 o'clock Saturday afternoon, March 11, 1899, in the Circuit Court room. On motion Mr. Aaron Blackford was chosen chairman and Silas E. Hurin secretary. Mr. E. T. Dunn offered a motion to the effect that it was the sense of those present that a bar association should be formed. After remarks by several of the attorneys, Mr. Dunn's motion was adopted.

Mr. George W. Ross then moved that the chair appoint a committee of five to formulate a constitution and by-laws. The motion being carried, Messrs. J. A. Bope, E. T. Dunn, George W. Ross, Jason Blackford and Harlan F. Burket were named as the committee. A constitution and by-laws having been adopted, meetings were held from time to time, and today the association is one that will compare well in the matter of qualifications, clear-mindedness and capability, with any that can be produced in this state.

MURDERS AND MURDER TRIALS.

In 1846 a horse was stolen in Hardin County, and the thief was pursued through this county, several persons here joining in the chase. Amongst them was John Parish, who resided in Williamstown, in this county. At Van Buren the thief was overtaken, and being hard pressed, left his horse and took to the fields about a mile beyond the village. Parish at once dismounted and pursued him. Overtaking him in the field, he closed with him, finally overpowering him. He then gave the signal for the others to approach, but while doing so, the thief pulled his revolver and shot Parish dead, making his escape. Afterward a man who gave his name as Benjamin F. Dulin, was arrested, charged with being the murderer. After an imprisonment of some months in the county jail, he had a preliminary hearing before the associate judges of the Common Pleas Court. A large number of witnesses were present from Lake and Geauga Counties, in the interest of the prisoner and he succeeded in proving an alibi and was discharged. It was, however, pretty generally believed that Dulin was the murderer. The prosecution was conducted by the late Abel F. Parker, who was prosecuting attorney, assisted by Aaron H. Bigelow. The prisoner was defended by Judge M. C. Whiteley and William M. Patterson. The real murderer, if Dulin was not, was never apprehended.

William Foster, a resident of Jackson Township, was indicted at the November term of court in 1856, for murder in the second degree, for the killing of his son, Andrew. Foster, it seems, was of a weak mind, irritable and easily influenced by others. He had married a second time, the mother of Andrew being dead. The boy was about fifteen years old, and he and his step-mother could not agree, and all misconduct, or supposed misconduct of the boy, was reported to his father, who became excited, and without inquiry would punish the boy severely. The boy was apparently possessed of a morbid appetite; his hunger was never appeased. He would even get up in the night and seek food. On one occasion, some food which had been prepared the evening before, was found to have been taken during the night. Its loss was charged to Andrew, and his father in a rage made an assault on him. The boy was afterwards found terribly bruised and injured in loins and back. From these wounds he afterwards died, and his father was arrested, indicted and tried for the killing. Judge Whiteley, who defended the prisoner, said afterwards that it did not certainly appear on the trial just who did inflict the wounds, as some evidence tended to show that the step-mother had also taken a part in the assault. Foster was tried at the April term in 1856. The verdict was manslaughter, and a sentence of five years in the penitentiary at hard labor was imposed. After serving about two years he died.

On the part of the State the trial was conducted by William Gribben, prosecuting attorney, assisted by William Mungen; the defence by M. C. Whiteley and Andrew Coffinberry.

There lived in Findlay in 1868, a man by the name of Adam Conkle, who had a wife whose character was not above reproach, and it was alleged that she had been frequently visited by one James Winnell, a young man employed about the offices of the court house as copyist. He was almost a stranger, and but little known of him, but he was generally regarded as a dissipated rough. He was, however, a fine penman. His visits to Mrs. Conkle coming to the knowledge of her husband, the latter warned Winnell not to come near his house, nor to hold any communication whatever with his wife, on penalty of being killed. But Winnell, whilst on one of his sprees, in April, 1868, visited the residence of Conkle, who then resided on East Main Cross Street. Being apprised of Winnell's visit, Conkle immediately hurried home, and on ascending the stairs, found Winnell and his wife in a room together. He of course, being highly excited, commanded Winnell to leave, who no doubt being afraid of bodily harm, seized a cavalry saber which happened to be in the room, assaulted Conkle, drove him from the room, and made his escape down the stairway. Thereupon Conkle seized a loaded shotgun standing in the hall and gave pursuit. Winnell fled across the lot in the rear of the house, scaled the fence into what is known as Hyatt's Alley, and made his way westward toward Main Street, hotly pursued by Conkle. When about two hundred feet east of Main Street, Winnell being closely pressed, turned upon

Conkle with the saber which he still retained, when Conkle fired at him, the charge entering near the left temple, causing instant death.

Conkle gave himself up, and after a coroner's inquest was held on the body of Winnell, had a preliminary hearing before E. T. Dunn, Esq., who held him to answer to the Grand Jury, in a bond of $1,500. The said jury, in October, 1868, returned a true bill of indictment for murder in the second degree. The trial was held in November, 1868, with Judge James Pillars on the bench. The prosecution was conducted by William Anderson, who was then prosecuting attorney, assisted by A. B. Shaffer. The defence was conducted by Henry Brown and A. Blackford, of Findlay, and W. V. Layton, of Wapakonetta. A great number of witnesses were examined, and the case was closely tried. The defence was that the prisoner, at the time of killing, was acting in self-defence, having been attacked by Winnell with a deadly weapon. Verdict of the jury, not guilty. The verdict was generally regarded as a just one. Conkle left the county at once, and was lost sight of from that day. The woman in the case also left before the day of trial, and has never returned.

On the morning of February 3, 1873, Jacob Gartee, a young man about twenty years of age, and whose parents resided in the town, deliberately murdered Nicolas Bensing, residing on the farm of M. D. Shaffer, Esq., just east of town, on the Tiffin road. Sheriff James L. Henry, Coroner Karst and Marshal John Ruhl had already, during the night, been informed of the murder, it having occurred early in the evening of the 2nd of February, and were on the ground, and before daylight of the 3rd had the murderer under arrest. The facts, as they afterwards developed, were substantially as follows: Gartee had been in the employ of Bensing for some time, chopping wood, and he boarded in the family. On the night of the murder, having armed himself with a single barreled pistol, he gave notice at the supper table that he was going into town. Mrs. Bensing, the wife of the murdered man, gave him a letter to mail, and he started, but instead of going directly to town, he concealed himself in the log barn in which the chickens were kept, and by causing an alarm among the chickens, he induced Bensing to approach to ascertain the cause. When the latter was within a few feet of him he placed the pistol between the logs and fired, striking Bensing in the breast, who retreated a few steps, fell and expired just as his wife, who had been alarmed by the report, arrived on the scene. Gartee then ran down the lane to the Tiffin road near the residence of William Snyder and thence proceeded to town.

After remaining in town a short time, he started to return to Bensing's, but was met on the road by a messenger, who informed him of Bensing's death, and a request that he return to town and inform the friends of the murdered man. Gartee returned with the friends and the officers, having become convinced that Gartee was the murderer, John Ruhl boldly charged him with the crime, which he admitted, and pointed out the place where the pistol was secreted. He was immediately arrested and lodged in jail. There were some ugly rumors afloat to the effect that the wife of the murdered man was perhaps a party to the crime; and the fact that the prisoner and the murdered man were good friends and had had no quarrel, and the further fact that there was no apparent cause for the commission of such a cold blooded murder, gave some color to the truth of these rumors. At the preliminary examination held before D. B. Beardsley, J. P., which was a most rigid one, so far as Mrs. Bensing was concerned, no evidence sustaining the theory of her guilt was found. Gartee was committed without bail for the crime of murder, and on May 28, 1873, the Grand Jury returned an indictment of murder in the first degree. The case came up for trial, on a plea of not guilty, before Judge Pillars, and a carefully selected jury. The trial began on the 29th day of July and lasted about ten days.

The plea for the defence was insanity. The prosecution was conducted by Prosecuting Attorney George F. Pendleton and W. H. Anderson, and the prisoner defended by Henry Brown and M. D. Shaffer. The verdict of the jury was "murder in the second degree." The prisoner was sentenced to the penitentiary for life, at which place he died in less than a year from the time of his sentence.

The death by poison, of Mrs. Malissa Charles, wife of John Charles, on the 6th day of June, 1876, threw Orange Township and all that part of the county into a state of wild excitement, which was intensified when it was known that Isaac B. Charles, a brother of the husband of the deceased, had been arrested, charged with the crime of murder. At the preliminary examination, before William M. McKinley, Esq., as well as on the final trial, the circumstances connected with the case were developed about as follows: Mrs. Charles had made bread from flour purchased shortly before at Ada, O., and the family partaking of it, became suddenly sick, eleven of them in all, and Mrs. Charles died from its effects. The prosecution had two theories regarding the matter. One was, that the flour, after being purchased at Ada, had remained in the wagon standing in an alley, while the family were at dinner, and that whilst there, the sack had been opened by the prisoner and poison introduced, which showed its presence in the bread. The other theory was that the poison—arsenic—had been placed in the yeast crock at the house of the murdered woman, by Isaac B. Charles while on a visit to the family, and that the poison had been obtained from a quantity purchased by John Charles, husband of the woman, for the purpose of killing rats, and left in the room where the yeast crock stood, which was a kind of up-ground cellar. The cause for the poisoning—for there seemed no apparent one—was said to be found in the fact that Isaac B. Charles, having been formerly treasurer of the village of Ada, and about to become a defaulter, made use of a large sum of money belonging to the estate of his father, of which estate he was administrator, and now that a settlement was to be made, formed a plan of murdering, by poison or otherwise, all who stood between himself and the balance of his father's fortune, and that the poisoning of this family was but the first step in the plan.

An indictment for "Murder by Poison" was found on the 21st of October, 1876.

After much delay and the interpositions of a number of motions, the case was finally tried in January, 1877, before Judge Pillars and a jury on a general plea of "Not guilty." The verdict rendered was "Guilty of Murder in Second Degree." The prosecution was ably conducted by Henry Brown, prosecuting attorney, assisted by Frank H. Dougherty, of Kenton, and W. H. Whiteley, of Findlay, and the defense was stubbornly made by A. Blackford, J. F. Burkett and J. H. Smick, of Ada. Charles was sentenced to the penitentiary for life, but after serving about twenty-five years was paroled upon the condition that he was never to return to Hancock County.

Professional jealousy gave rise to one serious crime in the history of our county. In 1877 there lived in the village of Benton Ridge, this county, Henry K. Nott and Frank H. Knapp, both practicing physicians. Unfortunately there had sprung up bad feelings between the two, the result, no doubt, of professional jealousy and the over-officious meddling by the friends of both parties, and although mutual threats had been made, no one could believe that much else than a war of words, or at the farthest, a little bout at fisticuffs would be the result. Imagine the consternation when the news spread over the village that Dr. Knapp had in broad daylight shot Dr. Nott to death, on one of the streets of the town. Dr. Knapp was at once arrested, taken before John Bergman, Esq., who at once remanded him to the jail of the county to await the action of the Grand Jury. Intense excitement prevailed; the friends of the two unfortunate men took sides, and for a time society was so torn up that almost everybody in the village, or who came to it, was regarded with suspicion by one side or the other. The killing was done on the 15th day of November, 1877, and the court being then in session, a special Grand Jury was duly impanelled on the 5th day of December, which returned a verdict of "Murder in the First Degree."

On this indictment the defendant was tried on a plea of "Not Guilty," the defense being that the shooting was done in self-defense, it being claimed that the murdered man had made an assault on the defendant just previous to the shooting, and that he had fired two shots at the defendant intending to kill him, and that to save his own life the defendant did the shooting which killed Dr. Nott. This the prosecution denied, and alleged and sought to prove that at the time of the shooting and just previously thereto, there had been no quarrel, no meeting in fact between the parties, but that the defendant had gone to the lower end of the village, procured a gun, came back, sought out his victim, whom he found on a side street, approached him unperceived, and without notice deliberately shot him, from the effects of which Dr. Nott immediately expired. Upon these declarations the case was tried before a jury, impanelled after all the motions and objections known in criminal practice had been made and overruled, Judge Pillars presiding. After a trial which lasted twelve days, and arguments covering three days more, the jury returned a verdict of "Not Guilty." Prosecuting Attorney Henry Brown and E. T. Dunn conducted the prosecution, and A. Blackford and M. D. Shaffer managed the defense.

William Trankner was indicted for murder in the first degree, having stabbed one Frank Ricksecker, September 7, 1889, from the effects of which wound the said Ricksecker died the next day. Upon trial, Trankner was found guilty of manslaughter, and was sentenced to serve a term of seven years in the Ohio Penitentiary. Jas. A. Bope, prosecutor. Dunn, Meehan & Doty, attorneys for defendant.

Joseph Donovan was indicted for murder in the second degree, having killed one John McManness, November 3, 1889; was tried and found guilty. He was sentenced by Judge A. B. Johnson, to five years in the Ohio Penitentiary. Harlan F. Burket, prosecutor, assisted by Jas. A. Bope. E. T. Dunn, attorney for defendant.

James Lawson was indicted for first degree murder and was found guilty of manslaughter, at the October term of court, 1892. He was sentenced to three years in the Ohio Penitentiary.

George Karg for the killing of one Abraham Wise was indicted by the Grand Jury, at the September term of court, 1895, was found guilty of manslaughter and sentenced to the penitentiary for a period of ten years. Theo. Totten, prosecutor. E. T. Dunn and C. W. Bente, attorneys for defendant.

On the 3d day of August, 1896, Amos Decker shot and killed one George Miles. He was indicted by the Grand Jury for first degree murder. At the close of the evidence offered by the State, Decker tendered a plea of guilty of manslaughter, which was accepted and he was sentenced to serve a term of twenty years at hard labor in the Ohio penitentiary. Theo. Totten, prosecutor. E. T. Dunn and John Poe, attorneys for defendant.

On the 20th day of February, 1898, while attempting to capture and arrest Frank Carmen and Edward Pratt, who were burglarizing a storehouse of the New York, Chicago and St. Louis Railroad Company, Police Officer William Holly was shot and killed. The two men were taken and indicted jointly for murder in the first degree. Separate trials were had for these men which resulted in the acquittal of Pratt and the conviction of Carmen of manslaughter. Carmen was sentenced by Judge Charles M. Melhorn, to the Ohio penitentiary for a term of twenty years. Charles E. Jordan, prosecutor. John Poe, attorney for defendants.

As the result of a drunken brawl, John Sherman met his death at the hands of his brother-in-law William Teal, May 9, 1907. Teal was indicted by the Grand Jury, June 3d, 1907, for murder in the second degree. His trial began on the 7th day of October, that year, and the jury returned its verdict of guilty of manslaughter, on the 11th day of the same month. Ten days later he was sentenced by Judge William F. Duncan, to serve a term of ten years in the Ohio penitentiary. Prosecutor, William L. David. Attorney for defendant, E. T. Dunn.

As the result of a quarrel over a game of craps, Arthur White, a colored man, met his death at the hands of one, Richard Drake, also colored. White died July 12, 1904, just seven days after having been stabbed by his assailant, who was later indicted by the Grand Jury upon a charge of murder in the second degree, was tried at the September, 1904, term of court, found guilty as charged, and sentenced to five years in the Ohio penitentiary. Drake's attorney, Charles V. Bish, prosecuted error to the Circuit Court and succeeded in reversing the judgment of the Common Pleas Court, securing a new trial for his client. Upon the second trial, February 4, 1905, Drake was acquitted of the charge. Prosecuting attorney, William L. David. Counsel for defendant, C. V. Bish.

There were a few other indictments found for felonies of the kind treated of in this chapter, but the parties were never put on trial under the indictments. In 1854, Philemon P. Pool was indicted for an assault with intent to kill. Samuel Ramsey was indicted for stabbing Nicolas Oram with intent to kill. Dr. R. J. Haggerty was indicted for the killing of Dr. Mansfield at Mt. Blanchard, and Levi Chain was indicted for the killing of his son at Findlay, by stabbing him with his pocket knife. All these cases were disposed of on pleas for lesser offenses.

FIRST JAIL AND COURTHOUSE.

In July, 1830, the county commissioners determined to build a jail, and it was ordered that said jail should be "sixteen feet wide, and twenty-four feet long, with a partition in the center. The timber to be white oak, twelve inches square, with two doors and three windows." The jail was built on the Public Square, its site being about midway between the present Court House and "old white corner store"—now the Buckeye National Bank Corner. With this location it seems that some of the citizens of the county were not well pleased, for in December of the same year, it is recorded that a petition was presented by sundry citizens praying for the removal of the jail from the Public Square in the town of Findlay. But the commissioners rejected the petition, thinking no doubt that the sight of such an institution would have a restraining effect upon the somewhat wild community. It was not, however, a formidable looking structure, and that it had neither beauty nor strength to recommend it. The prisoners used to amuse themselves by burning down the door, or removing the iron bars from the windows, and after escaping, report themselves to the sheriff, who would conduct them back to the place whence they came. But the old log jail was finally superseded by a structure more in keeping with the wants of the county, and providing for the better security of the prisoners. (The first building south of the Post Office, now owned by B. Webber), and this in its turn has since been replaced by a structure magnificent in its proportions, and of ample security.

Previous to the year 1831 the courts had been held in the old log schoolhouse, but now increased facilities had become necessary. The minds of the people had been prepared for a building such as was needed, and the financial condition of the county was such as to permit its erection. Whereupon the county commissioners at their December session in 1831, ordered as follows:

"That advertisements be posted up in three public places, for constructing, putting up and furnishing a frame in the village of Findlay, the building to be 24 feet by 36 feet, two stories high. Lower story to be nine feet in the clear, and the upper story eight and a half feet in the clear. Lower story to have a hall or entry eight feet in the clear. Lower story to have a hall or entry eight feet wide, through the center, with good partitions on either side of planed boards. The one end to be divided by a partition through the center, dividing it into equal parts. A good substantial flight of stairs to be put up in the entry. One front door, one back door to said entry, both to be of panelled doors, the front one to have four lights over it. Four twenty-light windows in front, and two back of twenty lights each in lower story, and five twenty-light windows in front in upper story and three same size back.

Glass to be eight by ten, and well puttied in. The upper story to be ceiled with three-quarter boards, planed, tongued and grooved. A good joint shingle roof to be put on. The building to be underpinned with a good, rough stone wall, laid in lime and sand mortar, raised eighteen inches above the surface. With plain door into each room, all the doors to be hung with three-inch cast-iron butts, the lower floor to be laid out of white ash boards, not to exceed six inches in width. The upper floor to be of white or blue ash boards of the same width; both floors to be tongued and grooved, and joints broken, and well nailed. The sills, posts and sleepers of the frame to be of white oak, the studding not to exceed two feet from center to center, joists same distance apart. Good sufficient locks on all the doors, and plain latches and handles. Plain eave-troughs and cornice. The front to be weather-boarded with poplar, planed, and the remainder with black walnut, rough. A washboard and chair-board upstairs and down, a plain bannistering to the stairs, together with substantial bannistering at the top of the stairs."

The commissioners met on the 16th day of January, 1832, the time appointed for opening the bids for the above work. Two proposals were handed in, one from Mathew Reighley for $750.00 and one from William Taylor, Frederick Henderson and Jonathan Parker for $700.00, which last bid was accepted. In June, 1833, the commissioners met and received proposals for plastering the court house, when the bid of Parlee Carlin was accepted, the price, however, was not named. Whereupon, Parlee Carlin entered into a bond to lath and plaster the several rooms in the Court House in a durable and workmanlike manner, and complete the same by the first of the following November. The building was erected on the southwest corner of Main and Crawford streets, the site now occupied by the Jones Building (First National Bank), and was used as a court house, school house and church until the completion of a brick structure court house in 1841. The old court house has since been removed to the south part of Main Street, just north of the First Presbyterian Church, (now the Donnel Block), and was occupied by Jacob Carr and family as a residence. After having served as a court house it was for many years used as a hotel. The county commissioners were very solicitous about the good usage and the authorized occupancy of this new structure, and passed not a few orders touching the matter, and prescribing the terms on which it could be occupied.

The Court House was examined and accepted by the commissioners in March, 1833. At their December session, 1834, it was "ordered that the auditor do cause to be erected in the Court House a suitable seat for the Court. Also that he do procure two sets of chairs for the Court room." At a session of December, 1836, "Ordered that all religoius societies be prohibited from holding meetings in the Court House after the 1st day of January, 1837." But the authorities soon relented, if indeed they ever attempted to enforce the order, for at their very next session, that of March, 1837, the records show this action: "Ordered that the Presbyterian Church and the Methodist Episcopal Church, of the town of Findlay, each pay into the treasury of Hancock County, the sum of seventy-five cents per month for the time they occupy the same, for the use of the Court House for religious purposes, to commence from this date." At the same session it was "Ordered that the Directors of School District No. 1, in Findlay Township, pay into the county treasury at the rate of eleven dollars for six months, for the use of the Court room for a district school."

But everything in time outlives its usefulness, and in March, 1840, it was ordered by the commissioners "that the auditor of the county of Hancock offer the lot that the old Court House stands on, including said building, at public sale, one third of the purchase money in hand, the balance in two equal annual payments, on the third Saturday of May next, advertising the same thirty days previous to the day of sale." The property was sold to one Jacob Barnel.

CHAPTER X.

THE PRESS.

Early News Conditions—Presses in Use—The Old Time Compositor—Leading Newspapers of the County—Their Proprietors and Editors—Value of the Daily Press.

In the early history of our county mail facilities were poor, the mails being carried on horseback, and by the time the few newspapers taken by the people reached their destination, the news was stale. It took a month at least to get the latest news from Europe, and in the very early days of journalism in this section, local items were almost unknown. The papers were filled chiefly with the doings of Congress, the quarrels of the political parties, and foreign affairs. The daily then was not dreamed of, and such papers as there were contained few original communications.

The first newspapers were printed on the old hand press, the famous "Washington," which is still found in some country offices, especially in the South. Working this press required the strength of a giant, and of course but one page of the paper could be printed at a time. There were few editorials in those days; the editor relied chiefly upon scissors and paste-pot, and never troubled himself about "leaders" and the like. It required half the week to print the meager edition on the miserable presses then in vogue, and not infrequently the editor took a turn at the press himself.

In those days also the enterprising reporter was unknown. There was no county correspondence, no recording of neighborhood doings, no localizing at all. The old newspapers just plodded along. The publishers took nearly everything in exchange for subscriptions—wood, flour, garden produce, and even whiskey.

There was no "display" in the few advertisements that found their way into the first newspapers of the county, and the knack of writing advertisements had not then been discovered. There were advertisements of musters, strayed animals, runaway apprentices, and little more, I believe that the newspapers of the past were as much read by their patrons as are those of the present day, because they had nothing else to read, if we except the few dry volumes that looked lonely on the bookshelf of the home. The papers were then read aloud at night to the household by the head of it, including the month-old news that filled the narrow columns. News not over a month old was considered fresh, and if a paper printed anything with not more than a week's age upon it, it was looked upon as a marvel of enterprise.

The old-time compositor was usually a character. He tramped the country afoot, and when the editor was out of town he "set up" the paper, worked the press himself, collected subscriptions, and, in short, was the "whole thing." Some of these geniuses did not belong to the temperance societies, and now and then the non-appearance of the paper was owing to the chronic "indisposition"—to use no harsher term. The tramp printer has almost disappeared, though now and then one puts in an appearance, works a few days, and again becomes the "Wandering Jew" of the profession.

On the 10th of November, 1836, the first issue of the paper now called the Hancock Courier was given to the few citizens of the small hamlet of Findlay. The Courier is older than the city, as Findlay was not incorporated until two years later. It was the first newspaper in Northwestern Ohio and for a time it had a precarious existence. At that time it was an 18x26 inch sheet. The nearest paper mill was at Delaware, with no means of transportation save by wagon over muddy, and at times, almost impassable roads; it might perhaps be said that there were no roads at all. The paper was first called the Findlay Courier, but at the beginning of the second volume the name was lengthened to "The Findlay Courier and Hancock and Putnam Democratic Shield." In 1851 the name was changed to The Hancock Courier, and this name has been retained ever since, except that the superfluous "The" was dropped in 1862.

The Findlay Courier was established November 10, 1826, by Jacob Rosenberg and edited and published by him until January 17, 1839. Mr. Rosenberg was born in Bedford, Bedford County, Pa., October 13, 1811. He came to Findlay on the 29th of September, 1836, and started the paper shortly after, as stated above. On the 24th of January, 1839, Mr. Henry Bishop purchased the Courier and edited and published it until July 1, 1845. Mr. Bishop was born and raised in Franklin County, Ohio. In 1851 he was elected to the Ohio legislature and filled the office with ability for two terms. After selling out the office in 1845 he removed to his farm in Eagle Township. He was drowned in Eagle Creek in June, 1855.

On July 1, 1845, Mr. William Mungen purchased the Courier and conducted it until some time in November, 1849. In November, 1849, Mr. William Case rented the office for one year. He was an easy-going, careless fellow and never appeared to care whether or not the paper came out on time. During this year Mr. Mungen did most of the editorial work. At the close of Mr. Case's lease the office was rented to Mr. B. F. Rosenberg for a short time. In the spring of 1851 Mr. Henry Brown purchased a half interest in the Courier. (See his sketch in the chapter on Bench and Bar.) Some time in the spring of 1851 Mr. Aaron Blackford purchased the interest of Mr. Mungen in the Courier and continued in partnership with Mr. Brown until the close of 1856. Mr. Blackford's biography also may be found in the chapter on Bench and Bar.

In January 1857 Mr. Benjamin F. Rosenberg purchased the Courier and conducted it for six months. Mr. Rosenberg was the son of the founder of this paper. On the 25th of July, 1857, the Courier passed into the hands of Mr. A. M. Hollabaugh, who published and edited it until March 1, 1861. On the eighth of March, 1862, Messrs. L. Glessner and son assumed the charge of editing and publishing the Courier and continued until January 1, 1865. On the 1st of January, 1865, Mr. William L. Glessner assumed control of the Courier and edited and published the same until May 1, 1866.

Mr. Lewis Glessner assumed charge of the Courier from May 1, 1866, until his death, which occurred March 13, 1879. The Daily Courier was established March, 1887, by G. and Fred Glessner, from which time Fred Glessner assumed control and served as general manager and editor until February 24, 1898, when Arnold and Mr. Henry took possession for one year. Afterwards J. L. Patterson, T. A. Dean and others formed a stock company and purchased and assumed control of the Courier and under their management the paper made rapid progress. October 29, 1902, Mr. Patterson released his holdings to other parties and the paper immediately passed under the management of T. A. Dean.

In 1889 a company was incorporated with capital stock of $25,000.00 and on July 20, 1903, it was combined with the Findlay Union. On June 17th, 1904, control passed to H. W. Brown and his associates, Mr. Brown assumed control, which he had held to present date. The present officers are: C. E. Jordan, president; M. G. Foster, vice-president; W. F. Hosler, sec. and treas.; and H. W. Brown, editor and general manager. This paper dates back to the days when Hancock County was just emerging from its primitive condition and Findlay was a straggling hamlet of cabins. It has published the obituaries of several opposition papers during the period of sixty-seven years, and has ever battled for Democracy and the rights and liberties of the people.

The Hancock Republican, the first Whig paper published in the county, was established by Arnold F. Merriam in January, 1838. It had a brief existence of about one year and, probably owing to lack of patronage, died a natural death in its infancy.

The Hancock Farmer was started by Jacob Rosenberg in 1842 as a Democratic paper in favor of nominating candidates by the delegate system instead of by popular vote, the latter system being advocated by Mr. Bishop of the Courier. The Farmer was published by Mr. Rosenberg until his death in October, 1844, and afterwards by the administrator Jacob Barnd. Early in 1845 William Mungen took possession of the office and issued his first number February 19th of that year. Toward the close of June Mr. Mungen purchased the Courier and consolidated the papers as the Democratic Courier.

The Western Herald was established by John T. Ford in January, 1845, in the second story of the old frame building on the corner of Main and Sandusky Streets now the Niles block. It was the second Whig paper started in Findlay. October 5, 1845, Mr. James M. Coffinberry assumed full control and edited and published the paper as The Findlay Herald until January, 1848, when he sold the office to Dr. David Patton and the paper soon after was suspended.

In September, 1848, Robert Coulter came

FOLK BROS.' STORE AND OFFICE, FINDLAY

TARBOX & McCALL PLANT, FINDLAY

THE C. L. SHEPPARD SANITORIUM & REMEDY CO., FINDLAY

CHARLES H. SHULER ELEVATOR, PLEASANT TOWNSHIP

to Findlay, purchased the Herald office and began the publication of a six-column folio paper called The Hancock Whig. He conducted the Whig until February, 1850, when he sold out to William P. Resznor, who published the paper about seven months, then disposed of it to George C. Lyon in September, 1850. Mr. Lyon was a man of great energy and with the hope of benefiting the paper changed its name to The Hancock Journal. In July, 1851, Mr. Coulter, who on selling out to Mr. Resznor had removed to Springfield, Ohio, returned to Findlay and again became the editor and publisher of the paper. Mr. Coulter published the paper until July, 1852, when the Journal suspended publication.

The first number of the Home Companion, a paper established by Samuel A. Spear, was issued June 8, 1854. It was a seven-column folio printed on a sheet 25 x 27 inches in size. The paper started as a non-political and more as an advocate of reform in the liquor law, and the advancement of education by the elevation and improvement of the public schools. In the spring of 1856 Mr. High L. McKee obtained an interest in the paper and was one of its principal promoters until April 24, 1857, when Mr. Spear became entire owner. On June 19, 1857, the name of the paper was changed to The Hancock Jeffersonian and it remained under the control of Mr. Spear until November 22, 1861, when it suspended business. After a few weeks Mr. D. R. Locke of Bucyrus, Ohio, came to Findlay and resuscitated the Jeffersonian. Under the new management the paper rapidly increased owing to the publication of the "Nasby Papers" which won for Mr. Locke a national reputation and the title of Petroleum V. Nasby. In September, 1864, Irvin S. Chamberlin purchased an interest in the Jeffersonian and in February, 1865, Mr. Locke sold his remaining interest to Otis F. Locke. In April the name of C. N. Locke appears in the editorial heading. On November 17, 1865, Mr. Chamberlin and C. N. Locke retired and Messrs. L. G. Thrall and Otis T. Locke became sole proprietors. In July, 1866, Mr. Thrall disposed of his interest to his partner and C. N. Locke again became one of the editors W. G. Blymer bought an interest in the Jeffersonian in December, 1866, and the firm was then Locke and Blymer. In February, 1868, C. N. Locke again purchased an interest and Locke & Blymer were editors and proprietors until September 4, 1868, when E. G. DeWolfe and Dr. A. P. Miller purchased the office.

On April 1, 1870, the paper came out in a ten-column folio as The Findlay Jeffersonian. In January, 1873, O. J. DeWolfe, a brother of E. G. DeWolfe bought Dr. Miller's interest and the paper continued under the management of the DeWolfe brothers until March, 1876, when E. G. DeWolfe became sole owner. The latter continued to edit and publish the Jeffersonian until April 28, 1876, when he sold it to his old partner, Dr. O. P. Miller, who before issuing a single number sold the office to A. H. Balsey, who published the first number under the new management May 5, 1876. He continued at the helm until January 6, 1902, when Mr. John M. Hoffa, of Bowling Green, purchased the office, and under the new management the paper is becoming one of the largest in circulation. On June 5, 1881, this paper was changed to the Findlay Weekly Jeffersonian, because the daily which was started November 15, 1880, was called the Findlay Daily Jeffersonian.

The Reporter was started June 18, 1872, by

C. G. and J. K. Barnd and originally was a literary paper. In October, 1872 J. K. Barnd sold his interest to C. G. Barnd and the paper attained a very respectable circulation until early in its second year, it drifted into the grange movement, hoping to become a great organ among the farming community But the change proved a mistake and the paper's patronage began decreasing. The name was finally changed to the American Patron and when the grange movement subsided it became the Property Journal. It was published about five years and then ceased to exist.

Das Ohio Volksblatt, a German Democratic weekly paper, was started in 1877 by Adolph G. Zwanzig. After publishing the paper about one year he removed the office to Lima, where it was subsequently sold by his creditors.

The Findlay Weekly Republican was established by J. M. Beelman and James E. Griswold and the first number issued February 6, 1879. It was started in opposition to the Jeffersonian, many Republicans not regarding that paper as sufficiently "stalwart" to satisfy their ideas of a party organ. In July, 1879, Mr. Griswold sold his interest to his partner who enlarged the paper to an eight-column folio. On the 3rd of January, 1881, E. G. DeWolfe, then postmaster of Findlay, and Jason Blackford, a member of the Findlay bar, purchased an interest in the Republican. The following October Mr. Blackford sold out to Mr. DeWolfe and the paper was subsequently enlarged to a nine-column folio. Capt. H. H. Alban bought Mr. Beelman's interest July 28, 1882, and the firm of DeWolfe & Alban edited and published the paper until the death of Mr. DeWolfe, which occurred August 8, 1888, when H. P. Crouse became editor and S. P. DeWolfe business manager. On April 1, 1900, Mr. Crouse sold his interest to Jesse Huber, and I. N. Heminger and Mr. Huber became editor. On December 7, 1901, Mr. DeWolfe purchased more stock in the paper and became editor while Mr. I. N. Heminger became business manager. Mr. Alban about 1890 sold his interest to other stockholders and thus severed his connection with the paper. In November, 1903, the Findlay Publishing Company was organized and incorporated with a capital stock of $75,000.00, and purchased the Morning Republican and Evening Jeffersonian and continued the publication of both editions and at present they have a combined circulation exceeding 6,000 copies daily. The officers of the Findlay Publishing Company at this writing are as follows: President, Dr. U. L. MacLaughlan; vice-president, E. C. Taylor; secretary, J. D. Snyder; business manager and treasurer, I. N. Heminger. Mr. DeWolfe disposed of his interest in the Republican upon the organization of the Findlay Publishing Company in 1909. These papers moved into their new and commodious building at 308 Broadway, where they now have one of the finest newspaper plants in Ohio.

The Findlay Star was established by W. S. Hammaker and first issued August 21, 1882. It was a live progressive little daily, thoroughly Democratic in politics and during its career of less than two years was a welcome friend in 550 homes and business places. On April 21, 1884, Mr. A. H. Balsey, of the Jeffersonian, purchased the Star and consolidated it with the business of that office. In 1903 the Jeffersonian was purchased by the Findlay Publishing Company and is now published by that company.

The Findlay Wochenblatt, a German weekly newspaper, was established October 28, 1886, by A. Weixelbaum. The paper had a successful growth, and on April 1, 1888, Mr. Christian Heyn purchased the Wochenblatt and is now the owner. The Wochenblatt is regarded as a first-class German newspaper.

The Findlay Union was established in November, 1890, by H. Wilts Brown and Rufus M. Hern and was published under this firm name until March, 1892, when on account of ill health Mr. Horn sold his interest. August 1, 1903, the Courier Company purchased and consolidated the Union with the Hancock Courier, Mr. Brown, former publisher of the Union, becoming editor of the Courier.

Of papers published elsewhere in this county the following are worthy of special mention:

The McComb Record was started July 4, 1894, by E. L. Sutton and L. G. Herbert, and a few months later was sold to the H. H. Moore Printing Company.

The McComb Herald was organized in 1881, by J. F. Hickerson and others. S. B. Davis, R. M. Horn, H. M. Pomeroy and Daniel Dyer have at different times been editors and managers of this paper. Mr. C. W. Griswold is the present editor and manager The McComb Herald has the largest circulation of any paper in the county, excepting the two Findlay dailies. It reaches at least twenty-seven per cent of all the people residing in McComb and the vicinity, giving all local and general news that would be of interest to the people. The circulation in round numbers has reached 1,200.

Arlington can boast of a paper second to none for towns of its size. This paper is published by Mr. Frank Bitler, a very able writer.

There were other papers in various localities of this county, some are still living, while others have lapsed into oblivion. "But," in the words of a former historian, "whatever their length of life was or may be, the newspapers are one of the best educational mediums we today possess. The farmer, the laborer, the merchant, the banker, the mechanic, the professional man; the business man in all stages of physical, mental or moral duties have each an equal opportunity to instill in their minds the current history as it swiftly glides across the stage of time."

CHAPTER XI.

THE MEDICAL PROFESSION.

Hancock County Medical Men of the Past and of the Present.

The first permanent physician in Hancock County, was Dr. Bass Rawson, who was born April 17, 1799, in the town of Orange, Franklin County, Mass. He was one of five brothers, who removed from Massachusetts at an early day and settled in Ohio, four being physicians. In his boyhood he worked on a farm and attended a country school. From the farm he went to learn the trade of hatter, which he worked at until he was about twenty years of age, but, his health somewhat failing him, he determined to relinquish it and engaged in the study of medicine. With this end in view he entered an academy at New Salem, Mass., which he attended several terms. In the meanwhile he taught school for the purpose of earning money to defray the necessary expense of his education. At the age of twenty-five he married and immigrated to Ravenna, Ohio, where he remained a few months. He then removed to Otsego County, New York, locating at Richfield. Here he again taught school. Previous to his leaving Massachusetts he had studied medicine for a few months, but on his return to the east he took up the study seriously, with the intention of qualifying himself as a physician, Dr. Thomas, of Richfield, becoming his preceptor. In the winter of 1826-27 he attended medical lectures at Dartmouth College, New Hampshire, and at the close of the collegiate term returned to his father's house at New Salem and continued the reading of medicine with Dr. Brooks of Orange. In June, 1828, he removed to Ohio and practiced a little more than a year with his brother, Dr. Secretary Rawson, who resided in Medina County, Ohio. In September, 1829, he removed to Findlay, where he settled permanently in the practice of his profession. The place had been but recently settled and only twelve white families resided within its limits, the Indians being more numerous than the whites. Here the doctor practiced without cessation, for over sixty years. He was a member and earnest supporter of the Presbyterian church. In politics he was a Republican. His death occurred December 28, 1891. The writer remembers a little incident that happened to the Doctor, and which he used to tell.

When making the trip from Medina County, to Hancock County, they stopped along the roadway to rest and prepare a meal. While thus engaged, a man rode up and asked if this was the new doctor that was coming to live in the neighborhood, the Doctor replying that he was, the man then said that he had a very sick wife, and would the Doctor please come right away and see her. And so, eating a hurried meal, the Doctor went away with the man. Thus his practice was started, even before he had reached the end of his journey into the new country that he had picked out for his future home.

Charles Oesterlin, M. D., was born in Weinsburg, Kingdom of Wurttemberg, October 5, 1807. When quite young he attended school at Laufen on the Necker. At fourteen he entered the gymnasium at Stuttgart, from which he graduated at the age of eighteen in a thorough literary, scientific and classical course. He then went to Tubingen, where he engaged in medical studies under an able professor. In 1832 he came to America and after spending some considerable time in traveling through the country located in Ashland, Ohio, in 1834. September 30, 1836, he came to Findlay, where he was engaged in his profession until his death, which occurred January 18, 1889. In 1846 he embarked in merchandising here for two years, at the end of which time he retired. From 1848 to 1862 he served in the councils of the city; in 1871 he was elected to the legislature and filled that office for one term. In 1863 Dr. Oesterlin visited his native land and again in 1876, when he was recalled by the loss of several thousand dollars through the breaking of the Findlay Savings Bank Company. In June, 1885, along with his estimable wife, who had always accompanied him, he again started for his old home in the Fatherland but got sick in New York and did not cross the ocean, but returned home. Mr. Oesterlin was an ardent supporter of all measures tending to advance public interest. He was probably the first to advocate boring for natural gas at this place and was one of the stockholders of the Findlay Natural Gas Company.

William H. Baldwin, M. D., was born in Champaign County, Ohio, January 16, 1810, and settled in Findlay, Ohio, in the fall of 1832. Having studied and attended lectures at Cincinnati, he entered the medical profession in early life and rose to a very respectable rank as a physician. His high reputation and success gained him a very large practice, which extended into adjoining counties, as well as all over the one in which he lived. His extensive practice necessitated long and frequent rides, and those who enjoy the advantage and improvements of the present day know but little of what those rides involved. There were but few well beaten roads and scarcely any bridges, streams had to be forded, swamps and marshes had to be crossed and large tracts of country often under water had to be traveled; but distance, difficulties and ceaseless labors, neither discouraged nor checked this faithful physician in his untiring efforts to release the afflicted, honor his profession, and supply the wants of those dependent upon him for support. Dr. Baldwin was married April 18, 1835, to Mary J. Patterson, who was born July 13, 1817, in Harrison County, Ohio, daughter of John Patterson, who came to Findlay in 1834. In all the relations of life Dr. Baldwin was considerate, respectful, just and honorable and enjoyed the highest esteem of all the people, but hard and indefatigable labors at last produced their effects; the vigorous constitution was impaired, and he who had been the embodiment of health, and had so successfully practiced the healing art upon others, became prematurely old and feeble, and so continued during the few years before his death, which occurred December 14, 1868.

William D. Carlin, M. D., was born at Maumee City, April 27, 1822. His parents had settled here previous to the War of 1812. Dr. Carlin was the son of Squire Carlin, a pioneer of Hancok County of the year 1826. He was but four years of age when his parents settled in Findlay, where he grew to manhood, obtaining such education as the limited facilities of a frontier village could furnish. Before he was twenty years old he began the study of medicine with Dr. Bass Rawson, the pioneer physician of the county. In March, 1843, one month before he was twenty-one years of age, he graduated with honors from the Cincinnati Medical College. After his graduation Dr. Carlin began the practice of his profession in Findlay and continued actively engaged until 1846, when he was made surgeon of the Fifteenth United States Regular Infantry and went with his command to Mexico as that country and the United States were at war. He was the youngest surgeon in the American army. He served with distinction during the struggle and achieved a high reputation both as a soldier and surgeon. After his return from the war Dr. Carlin resumed the practice of his profession in Findlay. March 6, 1845, he was married to Harriet E. H. Rawson, daughter of Dr. Base Rawson, his medical preceptor. Three children were the fruit of this union—Dr. Cass R. Carlin, ex-Senator William L. Carlin and Mrs. Sarah A. Dondore. Of the three, only one—William L.—is now living. In 1849, on the discovery of gold in California, Dr. Carlin made a trip to the new gold fields in company with his father, brother and others. The party crossed the great plains and the Rocky Mountains. On his return to Ohio he made a second trip to the gold region, going and returning by the sea and the Isthmus of Panama. In the spring of 1862 he was appointed chief surgeon of the Fifty-seventh Ohio Volunteer Infantry, for service in the civil war. His experience in the Mexican war had given him a reputation as an army surgeon, and this fact was recognized by the government in making the appointment. Dr. Carlin did splendid service in his regiment and was the means of preventing much suffering and many hardships. He died in the service for his country at Milliken's Bend, Tenn., December 26, 1862, four months before reaching his forty-first year. He had led an active and useful life. Dr. Carlin was a man of kind and generous impulses and was held in high esteem by his fellow citizens. He was enterprising and public spirited and ever ready to do what he could to advance the interests of the town and county. He was held in great respect by the members of the medical profession, who depended largely upon him for advice and counsel. At the time he entered for service in the Civil War he had a large and lucrative practice in the town and county. He was the grandfather of Rawson K. Carlin, present police judge of Findlay.

Anson Hurd, M. D., was born in Twinsburg, Summit County, Ohio, December 27, 1824. His parents Robert and Mary (Brainerd) Hurd hailed from Connecticut and came from families whose names were connected with the early settlement of that State. In 1839 Robert removed from Twinsburg, Ohio, to this county and for many years was a prominent leader in the development of Hancock County, laying out and platting the town of Arlington in 1844. He died in 1860, at the age of seventy-six, leaving a large family, who at present is scattered considerably over the country. Our subject came with his brother Jared, to this county, and at Arlington cleared the land and built the cabin occupied by their father on his arrival. At the age of twenty he returned to Twinsburg where he remained for three years under the instruction of the Rev. Samuel Bissell, D. D., president of Twinsburg Institute. He then taught school in Pike County, where, becoming acquainted with the Hon. J. L. Van Meter, of that county, he obtained a scholarship in Delaware College. After spending three years in that institution he engaged in the study of medicine with Dr. William Blackstone of Athens, and after a year, repaired to Columbus and read in the office of Prof. Samuel M. Smith, graduating from Starling Medical College in March, 1852. He then located in Oxford, Ind., where he practiced his profession for many years. In 1861 he represented the counties of White and Benton in the legislature of that State. Soon after the attack on Fort Sumter he was invited by Governor Morton, of Indiana, to accept the Post of Assistant Surgeon of the Twentieth Indiana Volunteer Infantry, which he accepted, serving through the first campaign to Hatteras. Returning to Fortress Monroe, he resigned his commission in the Twentieth and accepted that of surgeon of the Fourteenth, and served in all the battles of the Campaign of 1862. In January, 1863, he resigned his commission, and in April moved to Findlay, where he engaged in the practice of his profession. Dr. Hurd contributed to various medical journals in the way of some very fine articles and held offices of trust in the medical world. He was a liberal supporter of measures tending toward the growth of the community.

Lorenzo Firmin, M. D., was born March 31, 1809, in South Wilbraham, Mass., son of John Firmin. When quite young he learned the trade of shoemaking with his father, with whom he was connected in the east till 1834, when he came west to Richfield, Summit County, Ohio, and entered into partnership with Dr. Secretary Rawson, in a tannery, which he continued in until 1841, when he sold out to O. M. Oviatt, of Richfield. In 1841 he came to Findlay, Ohio, read medicine with Dr. Bass Rawson and graduated in the profession. He practiced at Benton, this county, till 1847, when he returned to Findlay, where he thought an opening existed, owing to the fact that several physicians from Findlay were holding positions in the army during the Mexican war. He was married June 28, 1838, to Clara H., daughter of Dr. Secretary Rawson. They had no children. Dr. Firmin continued his profession in this place until his retirement in 1877, after which he gave his attention to his private business matters, which were many and important. His first wife having died in 1891, he was again married in 1894, his second wife being Miss Mary B. Humphrey, a native of Findlay. His death, which occurred on October 12, 1901, was received with profound grief by the community where he so long had been a resident and a very efficient promoter of the interests of the city and county.

William D. Detwiler, M. D., was born in Mifflin County, Penn., August 23, 1832. He learned the trade of plastering with his father, and in 1851 came west and located in Findlay where he carried on his trade for some time. He subsequently moved to Illinois, and, on returning from there in 1859 entered the office of Dr. Oesterlin, where he prosecuted the study of medicine. On the breaking out of the War of the Rebellion, our subject left his worthy preceptor's office and enlisted his service in defense of the Union. Three years of his time, however, were devoted to service as hospital steward, and upon the close of the war he returned to his medical studies, graduating from the Homeopathic Hospital College of Cleveland, Ohio, in 1867. Dr. Detwiler located in Findlay and for ten years was prominently identified with the profession of medicine in this portion of the State. His death occurred April 30, 1877. He was at that time president of the Ohio State Homeopathic Medical Society, and also president of the Alumni Association of Cleveland College. The Masonic, Odd Fellows, and Knights of Pythias societies, the Findlay Guards, and ex-soldiers all took part in the funeral ceremonies in his memory. Dr. Detwiler was an ardent Sabbath school and church worker, and was an acknowledged leader in all interests he sought to serve.

Tobias G. Barnhill, M. D., of Findlay, was born in Wayne County, Ohio, May 5, 1851, son of Joseph and Sarah (Frankhauser) Barnhill, the former a native of that county and of Pennsylvania pioneer ancestry, the latter born in Pickway County, Ohio. In 1853 they moved to this county and settled in Liberty Township, where they reared four sons and three daughters. Our subject who is the third child, received a good common school education and at seventeen engaged in teaching. At eighteen he began the study of medicine in the office of Drs. Oesterlin & Detwiler and in his twenty-second year graduated from the Cleveland Homeopathic Hospital College, class of 1873. He immediately began the practice of his profession in Findlay and has been successfully connected with it since introducing in 1880 his valuable medical baths. He married in 1874, Mary J., daughter of Conrad and Christiana Renninger, pioneers of Liberty Township, this county, and they have one son Joseph C. The doctor is a public spirited citizen and contributes liberally to the advancement of Hancock County's interests. He is a worthy Odd Fellow, a member of the Legion of Honor, has served as coroner of the county three terms and had been an active member of the board of education of Findlay. He owns and operates a large sanitarium where patients can go and receive the best care and treatment on very liberal terms.

Franklin Wayne Entrikin, M. D., was born in Chester County, Pa., July 27, 1830. He was the son of Emmor and Susannah Bennett Entrikin, of pioneer English Quaker ancestry in that state. In 1832 Emmor Entrikin moved to Columbiana County, Ohio, where he reared a family of five sons and one daughter in the Quaker faith. Franklin W. received a good literary training and at seventeen entered the Quaker academy at Salem. After completing a thorough literary and scientific course there he engaged in the study of dentistry, in which profession he spent a few years. He, however, continued to read medicine and graduated from the Ohio Medical College of Cincinnati. In 1855 he came to Findlay, where he spent most of his time since in professional practice until his death.

He, however, had spent some considerable time in public lecturing on his profession, and for three years held the chair of gynecolgy in Ft. Wayne, Indiana, Medical College. He has also contributed writings to many leading medical journals. He was a member of the Northwestern Ohio Medical Association and Cleveland Microscopical Society. He has had charge of the sanitariums in Cleveland and Green Springs. He served in the capacity of professor of gynecology in the Toledo Medical college in 1885 and delivered a full course of lectures in that institution in 1885 and 1886. The doctor married in October, 1851, Sarah Ann, daughter of Thomas Lyon of Deerfield, Portage County, Ohio, and by her he had three sons: Emmor L., a leading jeweler in this city; Leonidas A., also a jeweler; and Franklin B., a prominent young physican who is rapidly following in his father's foot-steps in his chosen profession. Our subject was a hard-working painstaking physican and was as much a student in his later days as he was when young.

Francis W. Firmin, M. D., was born in Richfield, Summit County, Ohio, July 15, 1842, and is a descendant of pioneers of that name in Massachusetts who came to our shores in 1630 in the fleet with Governor Winthrop. Our subject is a son of Francis B. and Mary (Chapin) Firmin. He received a good education in Wilbraham, Mass., and at Oberlin, Ohio. In 1862 he came to Ohio and engaged in the study of Medicine with his uncle, Lorenzo Firmin, and in 1867 graduated from the Cleveland Medical College. He located in Findlay, this county, and has been a very creditable professional worker here ever since. He married here 1869 Mary L. D., daughter of John A. Meeks, a pioneer minister of the Presbyterian Church. The doctor is a member of the American Medical Association, the Ohio State Medical Association and of the Northwestern Ohio Medical Association. July 15, 1863, he enlisted in Company E One Hundred and Twenty-ninth Ohio Volunteer Infantry and after serving his country for eight months was honorably discharged. He holds high rank in his profession as a liberal contributor to all measures tending to the development of the social and industrial life of this locality.

Joseph Parker Baker, M. D., was born in Perry Township, Wood County, Ohio, on the 9th of June, 1864. He was graduated at the Starling Medical College, Columbus, Ohio, in 1890; attended a course in the Polyclinic, New York, in 1894, and also a course at the Post Graduate, New York, in 1897. He is at present president of the Board of Health of Findlay, Ohio.

Don B. Biggs, M. D., was born at Arcada, Hancock County, Ohio, June 16, 1873. He was graduated from the High School at De Graff, Ohio; was three years at Delaware College, one year at the Ada Pharmacal School, three years at Somisville Medical College and graduated at Starling Medical College, Columbus, Ohio. He is an ex-coroner of Hancock County and a member of the Northwestern Ohio State and National Medical Societies.

John Charles Fremont Martin, M. D., was born at Covington, Miami County, Ohio, on November 10th, 1856, and was graduated at the Covington High School. He attended and was graduated from the Jefferson Medical College of Philadelphia, March 18th,

1881. He was an interne at the St. Mary's Hospital for two years. During 1883 and 1884 he was contract surgeon in the United States Army and was stationed at Ft. Keogh. During the Spanish-American war he served as Brigade Surgeon with the rank of Major. He is a graduate of the post-graduate course of London, England, and has practiced in Findlay since 1886.

Herbert Vinton Beardsley, M. D., was born in Findlay, Hancock County, Ohio, August 30, 1859. He received his literary education in the city schools and at the Oberlin College. He was graduated from the Cleveland Academy of Medicine in 1883 and practiced his profession for sixteen months at Ada, Ohio. He then removed to Findlay, where he has been in continued practice ever since. While an active politician, as every American citizen should be, he has never aspired for office, but served as member of the board of education for six years and is at the present time a member of the city council. He is identified with many fraternal societies and is the medical examiner of many insurance companies.

William M. Yost, M. D., was born in Thornville, Perry County, Ohio, April 14, 1835. He moved with his parents to Licking County, Ohio, April 1st, 1846, where he worked on the farm and attended the district school. He taught school from 1853 in winter and attended the Somerset Collegiate Institute in summer till 1860 when he was hired to superintend and teach the schools of Hebora, Licking County, Ohio, and then remained until July, 1862. He then enlisted as a private in Company "B,", 113th Reg. O. V. I., was promoted to the post of hospital steward and served in that capacity until the close of the war. He was mustered out July 15, 1865. After the war, in September, 1865, he entered Miami Medical College, at Cincinnati, Ohio, where he graduated March 15, 1868. He married Miss Rebecca A. Stewart of Jacksontown, Licking County, Ohio, May 26, 1868. Five children were born to them: Minnie L., Margaret J., Gertrude, Charles C., and Clarence C. Dr. Yost first practiced his profession in Houcktown, where he remained until May, 1876. He then moved to Mt. Blanchard, where he continued to practice until November, 1892, when he moved to Findlay, Ohio. He served on the school board continuously during his residence in Mt. Blanchard, Ohio. Dr. Yost served on the U. S. Pension Board of Examining Surgeons from 1884 to 1889 and from 1892 to 1897. He is still in practice at Findlay, Ohio.

A. W. Balsley, M. D., ex-coroner of Hancock County, was born November 14, 1872, and is a graduate of the Findlay High School, class of 1892, and of the University of Michigan (1899) and has practiced in Findlay for the last ten years. He is a member of the Hancock County, Ohio, State and American Medical Associations.

John M. Firmin, M. D., was born in Findlay, Ohio, October 31, 1872. He is a graduate of Findlay High School and Oberlin College (1894) and Master of Arts, 1897. He graduated from the College of Physicians and Surgeons, at Cleveland, Ohio, March 17, 1897; took the Post Graduate course at Bellevue Hospital in 1900. He has practiced in Findlay since his graduation.

Franklin B. Entrikin, M. D., was born in Findlay, Ohio, August 21, 1871. He attended the Findlay High School and Ohio State University, and was graduated from Ohio Medical

College at Cincinnati, in 1894, and subsequently practiced his profession in Findlay until his death, which occurred in Cincinnati, March 17, 1910. He was a member of the Association of Military Surgeons of the U. S. A., with a rank of Major of Medical Corps, Ohio National Guard; also a member of the Hancock County, Northwestern Ohio State, and National Association.

W. S. Van Horn, M. D., was born in Hancock County, Ohio, June 13, 1853. He attended the public school and was graduated from the Eclectic Medical Institute of Cincinnati, in 1883. He commenced the practice of medicine in Mt. Blanchard, where he remained for five years when he removed to Findlay, where he has remained until the present time. He is a member of the Northwestern Ohio Eclectic Medical as well as the State and National Association.

Allison M. Van Horn, M. D., was born in York County, Pa., July 31, 1882. He is a graduate of Findlay High School (May, 1900) and of the Eclectic Medical Institute of Cincinnati (1905). He has been engaged in the practice of medicine for over four years. He is a member of the Northwestern Ohio Eclectic and State Eclectic societies.

J. M. Guise, M. D., born in Findlay. Ohio, September 2, 1853. He was educated in the common and high schools and graduated from the Ohio Medical College of Cincinnati in 1887; has held the position of county physician, and has practiced in Findlay from the time of his graduation to the present writing.

Albert H. Linaweaver, M. D., was born in Springfield, Ohio, January 1, 1856. He attended the common and select schools and studied three years at Whittenberg College, Springfield, Ohio. He was graduated in medicine at the College of Physicians and Surgeons, Chicago, Ill., April 21, 1896, and took a post graduate course in the Eye, Ear, Nose and Throat College in Chicago in 1899. He has practiced in Findlay since graduating.

R. B. Keeran, M. D., was born in Sandusky County, Ohio, on February 20th, 1853. Took the Common School education of the day and graduated at the Eclectic Medical Institute in Cincinnati in 1876. Practiced in Marshall, Ill., for ten years and since 1886 to the present time in Findlay, Ohio. He is a member of the district and State Eclectic Medical societies.

P. O. Guise, M. D., was born in Findlay, Ohio, August 18, 1851. Educated in the common and high schools of Findlay and graduated from the College of Physicians and Surgeons of Baltimore, Maryland, in 1882 and has practiced continuously in Findlay ever since his graduation. He has held the office of township clerk for four years and of township treasurer for two terms.

J. E. Powell, M. D., was born in Eagle Township, Hancock County, Ohio, on April 15, 1861. The day the first gun of the Civil War was fired at Fort Sumter. He was graduated at the College of Physicians and Surgeons at Baltimore, class of 1890; has practiced in Findlay since his graduation and has served Hancock County as coroner.

Mrs. Cornelius B. Kennedy, M. D., was born in Van Wert, Ohio, June 20, 1862. She was educated in the common school and high school of Warsaw, Indiana, and graduated in medicine from the Toledo Medical College, March 31, 1896. She served three terms as secretary of the Hancock County Medical Society of which she is an active member, as well as a member of the Northwestern, Ohio and Ohio State societies.

Earl J. Thomas, M. D., was born in Biglick Township, Hancock County, Ohio, October 7, 1882. He is a graduate of the Findlay High School and attended one year at the Ohio State University of Columbus. He is a medical graduate of the University of Michigan, at Ann Arbor, class of 1905. After serving a year as interne in the Ann Arbor Hospital he located in Findlay, Ohio, for the practice of his profession.

O. H. Saunders, M. D., was born in Benton Ridge, Hancock County, Ohio, March 22, 1864. He was graduated from the Ohio Medical College of Cincinnati, Ohio, in 1891. He is a member fo the Hancok County, State, and National Medical Association, and is clerk of the Board of Education.

M. M. Crothers, M. D., was born in Crawford County, Ohio, on February 8, 1845. He attended the common and high schools and read medicine in the office of A. E. Jenner, a descendant of the famous Dr. Jenner, the discover of vaccination. Dr. Crothers graduated from the Medical Department of Wooster at Cleveland, Ohio, February 28, 1872, and practiced at Sulphur Springs, the succeeding sixteen years, when he removed to Findlay, Ohio. He has been a member and president of the city council and an ex-member of the State Legislature.

Milton S. Williamson, M. D., was born in Seneca County, Ohio, on December 19, 1850. and was educated in the common and high schools of Findlay, Ohio, after which he attended Heidelberg College at Tiffin, Ohio. He attended and is a graduate of the Medical Department of the University of Wooster at Cleveland, Ohio, in the class of 1874; also took a post graduate course at Rush Medical College of Chicago, Ill., in 1882; was a member of U. S. Examining Board of Pensions for eight years, twice president of the Hancock County Medical Society and member of the Hancock County State and National Associations and Physician to the Infirmary. He has practiced at West Independence, Arcadia, Fostori, Alvada and Findlay, Ohio.

Huron S. Wilson, M. D., was born at Vanlue, Ohio, December 6, 1856. He was educated in the common schools, attended Starling Medical College at Columbus, Ohio, and graduated at the Kentucky School of Medicine, Louisville, Ky., in the class of 1885. He practiced his profession at Vanlue, Alvada, McKutchensville and Findlay, Ohio. Ex-coroner of Hancock County, member of Hancock County, Northwestern, Ohio and State Medical societies.

J. W. Zophi, M. D., was born in Jeffersonville, Sullivan County, New York, April 12, 1859. He attended the common and high schools and was a student at and graduate of the Medical Department of the University of Buffalo, N. Y., in the class of 1889, after which he served a term as interne in the Buffalo Hospital.

N. R. McLachlin, M. D., was born November 26, 1859, in Middlesex County, Ontario. He attended the common schools and was graduated from the University of Michigan, Ann Arbor, in 1878. He practiced in Cass City, Tuscola County, Mich., for eleven years, moving to Findlay, Ohio, in 1889. Dr. McLachlin is a member of the Board of U. S. Pension Examiners and of the Hancock County, Northwestern Ohio, State and National Medical societies. He is also an ex-coroner of Tuscola County, Mich.

John Charles Tritch, M. D., was born in Findlay, Ohio, September 25th, 1857. He attended the city schools and was graduated from the Findlay High School in the class of 1874; entered the office of Doctor Wm. M. Detwiler, his uncle, and studied medicine there; attended the Homeopathic Hospital College at Cleveland and graduated in the class of 1877. He took post-graduate work in the New York Polyclinic in 1888, 1890, 1896 and 1903; also the New York Post Graduate in 1893; received the degree of A. M. from the Findlay College in 1896. Dr. Tritch is gynecologist to the Findlay Home and Hospital. He was a member of the City Board of Education for six years, and coroner of Hancock County from 1880 to 1884.

CHAPTER XII.

HANCOCK COUNTY SOCIETIES.

The Fraternal Lodges—The Odd Fellows—Masons—Elks—Tribe of Ben Hur—Daughters of America—Grand Army of the Republic—The W. C. T. U.—The Hancock County Agricultural Society.

HANCOCK LODGE NO. 73, I. O. O. F.

Hancock Lodge No. 73, I. O. O. F., of Findlay was instituted August 15, 1846, with the following charter members:

Abraham Younkin, tailor; Jacob Carr, a lawyer and dentist; Edson Goit, a lawyer and man of wealth, who built the first large building in town, where now stands Karg Bros. Meat Market; Abel Parker, a lawyer, father of Circuit Judge Robert Parker and J. H. Barr, a merchant. The institution was conducted by District Deputy Grand Master Henry W. Cronine, of Seneca Lodge, No. 35, of Tiffin, Ohio. He was assisted by Past Grand Richard Williams, Noble Grand George Knapp, Past Grands, Rollo Johnson and Wm. Beard of Seneca Lodge, No. 35, Columbus Lodge No. 9 and Huron Lodge No. 37, respectively.

After its institution, on December 4th and 13th, 1847, as appears in the Corporation Record of Hancock County (Vol. 1, Page 6), the lodge was incorporated under the laws then in force in the State by the holding of a special meeting for the purpose of the adoption and record of suitable resolutions, in which occurs the following in reference to its name: "Resolved that this society hereafter be known by the name of Hancock Lodge No. 73 of the Independent Order of Odd Fellows."

The installation services were held in the 2nd story of Jonathan Parker's carpenter shop, which was located on the rear of the lot where now stands the Patterson Block. After the institution of this lodge its existence in the community was a matter of much curiosity to those outside its portals. Why did they call themselves Odd Fellows? What terrlbie and awful ceremonies did they have? These men were objects of curiosity and perhaps some superstitious souls crossed themselves when an Odd Fellow appeared in the street. In those early days there existed a feeling of distrust of all secret societies, because they were misunderstood and misjudged. So prevalent was this feeling that Col. James Findlay, after whom our beautiful city was named, ran for Governor as the Anti Fraternity and Whig candidate. Nevertheless the order grew rapidly, not only in Hancock County, but all over the country, and the practical application of the principles and precepts of Odd Fellowship did more than anything else to dispell this distrust of secret societies. Odd Fellowship contains the best elements and principles for the welfare and happiness of the human race the Supreme Ruler of the Universe ever made known. It is a high conception of the duties of one man toward another and its field is the world. It aims to unite all men, all nations, in the bond of Friendship and Fraternity, recognizing the Fatherhood of God and Brotherhood of Men in its progress towards the betterment of the human race.

After about two years it moved to the attic of what is now the Kerr Block then owned by John Van Eman. After five years it again moved, this time to the Henderson Block, where now stands the J. T. Adams Building. The lodge remained here until the Patterson Block was finished in 1866, when it took up its quarters in this building. Each time it moved into better and more convenient quarters as the lodge grew and prospered.

While in the Henderson Building it held its First Anniversary Celebration, which was in the year 1857. This was quite an event in its history. It was this year that J. T. Adams, J. K. Clark and John Rutherauff joined the order.

The lodge stayed in the Patterson Block until the year 1865, at which time under the supervision of brothers Chas. E. Niles, James T. Adams, Jacob Powel, G. C. Barnd and W. M. Dettwiler, all of whom are now dead, as a building committee, was purchased the north half of its present Temple site, on which it erected a 25x100 foot, three-story, cut stone front building, with business rooms and offices on the first and second floors, and lodge appartments on third floor. This building was the first in Findlay in which plate glass windows were used, and before which a Berea stone sidewalk was laid. And it was at the time by far the finest and most imposing business block in the then village, and remained one of the best until the date of its remodeling below mentioned.

In 1901, the lodge purchased the south half of its present building site from J. T. Adams, thus securing a business front of a width of fifty feet on the principal business square of the city, with a depth of two hundred feet. Its lodge suite, on the third floor, has been held sacred under its dedication to the purposes and use of Odd Fellowship, and no other order is allowed to lease or use it. It shares, however, the use of this floor with Findlay Rebekah Lodge No. 237, and Golden Rule Encampment No. 92. Hancock Lodge, it is to be noted, is the only lodge or fraternity in the city of Findlay, which owns the property in which it meets. It has at the time of the issuance of this history a membership of over four hundred.

Hancock Lodge has been represented in the Grand Lodge and Grand Encampment of Ohio by the fellowship Elective Grand Officers, viz: Hon. J. F. Burket, late Justice of the Supreme Court of Ohio, grand master, 1882-1883; F. B. Zay, grand master, 1888-1889; C. E. Niles, grand treasurer, (died in office), 1897-1908; L. A. Baldwin, grand patriarch, 18—-18—.

Hancock Lodge had the honor of entertaining the Grand Lodge of Ohio during its

Session of 1875. It has furnished the representative to Grand Lodge a number of times, A. G. Fuller holding that office at present. All during its history it has included in its membership the leading men of all callings of the community and therefore the teachings of Friendship, Love and Truth instilled into the hearts of its members has been an uplifting influence in all walks in life.

During its existence it has paid in weekly benefits $18,000; to the widows and orphans fund in round numbers $9,000; for funeral benefits $5,750. The greater part of this has been paid since 1890; from its early days the nursing was done in alphabetical order by the members instead of a hired nurse as today. The greatest amount paid in one year was in 1905, when it paid out $1,704. It has paid to two brothers over $1,000 each. In a number of other cases it has paid out sums approximating $500. Not only are its members well cared for in distress but their families are objects of fraternal care. The lodge is now caring for several widows and has a number of orphans in the Springfield home.

There have been so far as can be ascertained 118 deaths in the lodge. One of its members, Parlee C. Tritch, has had a wonderful lodge record. He has been an active member of this lodge over 56 years and is proud to say he has never been on the sick list in all that time. Brother Tritch wears a Veteran Jewel for having been a member fifty years. This was a gift of the Brothers of Hancock Lodge.

The following old time veteran members have been active for over 40 years: Paul Bryan, J. W. Exline, Sr., John N. Kline, John Haley, C. Kraus, John Haley, Samuel Van Atta and Wm. France now living at Bucyrus, Ohio, and E. S. Kimber residing at Kansas City. The lodge is proud of these old time members, who laid the foundation for its present prosperity.

Probably the most celebrated event in the history of Odd Fellowship in Ohio was the laying of the Corner Stone of the present Court House in this County. This is the only instance that we can find record of where Odd Fellowship was placed in the front and given entire charge of such a celebration. The service used that day, August 11, 1884, by the Patriarchs Militant, who had charge of the service, was written especially for that occasion.

Hancock Lodge has been the Father of nearly every other Lodge of Odd Fellows in the County. From her membership have gone out brothers who have withdrawn to become charter members of these lodges. Always progressive there have been terms when much more work was done than during others. The first large class of candidates were initiated in 1867 when under H. B. Green as Noble Grand, 27 members were taken in.

Under Noble Grand E. B. Howell, in 1868, 19 candidates were received.

Under Noble Grand J. F. Burkett, in 1872, 28 candidates were received.

Under Noble Grand D. C. Fischer, in 1873, 22 candidates were received.

Under Noble Grand C. E. Niles, in 1885, 21 candidates were received.

Brother Niles brought into the lodge at least one candidate during every year of his membership.

Under Noble Grand J. S. Humphrey, in 1885, 24 were received.

Under Noble Grand R. E. Ellisin, in 1886, 17 members were received.

Under Noble Grand U. K. Stringfellow, in 1887, 22 were received.

Under Noble Grand J. W. Zellers, in 1888, 23 were received.

Under Noble Grand A. J. Burner, in 1889, 22 were received.

Under Noble Grand M. T. Burner, in 1890, 19 were received.

Under Noble Grand G. W. Yates, in 1891, 22 were received.

Under Noble Grand W. C. Nusser, in 1900, 20 were received.

Under Noble Grand J. S. Jones, in 1902, 26 were received.

Under Noble Grand C. C. Clark, in 1903, 29 were received.

Under Noble Grand P. J. Riemund, in 1905, 31 were received.

The class under Noble Grand Ed. Reimund, in 1906, of 34, speaks eloquently not only of the progress of the order but the interest manifested in its welfare by the membership, a large number of whom worked hard to get up this class, but of also the kind of timber it accepts out of which to make Odd Fellows.

Not only have large classes been taken in at times but a large majority have been young men. Our order has been called an old man's order. While this is not true of the order in general, especially it is not true of Hancock Lodge. However, we are very proud indeed of our old and faithful members, many of whom are even now in their old age its most regular attendants.

One brother, now deceased, who was member over fifty years and chaplain over thirty of that time, Rev. R. H. Hollyday, seldom missed a session of the lodge during his entire membership, which continued until the time of his death, October 24, 1905.

Odd Fellowship was the first Fraternity to provide women with an organization. The degree of Rebekah was founded in 1851. The Findlay Rebekah Lodge was founded September 22, 1888, with thirty-five charter members and now has over 150 and is one of the most progressive in the State of Ohio. One of its members, Miss Nora Kagey, has been honored with the presidency of the order in this state.

Hancock Lodge ranks one of the most progressive in the state and is noted for its benevolence and public spirit. Its degree team under the leadership of G. E. Dennison is second to none. It has been invited to appear before the Grand Lodge and is called upon for special degree work by many of the lodges in Northern Ohio.

FINDLAY LODGE, NO. 227, F. AND A. M.

In referring to the early history of Masonry in Findlay, we are met with the usual difficulty, in getting the first facts, in regard to events long past. The records say, that on January 16, 1852, a meeting was held in Odd Fellows Hall, with Abraham Youngkin as Worshipful Master, at which the dispensation for a lodge at Findlay was read in open lodge. There is no copy of the petition for the dispensation, nor of the dispensation itself extant. Presumably the names on the dispensation were the same as those on the charter. The names appearing on the charter are: Abraham Youngkin, Abel F. Parker, Ed. Parker, James M. Coffinberry, George Arnold, Adolphos Morse, Eli S. Reed, David Patton, and Cloyse B. Wilson. At this first meeting Thomas McKee made application to become a member by demit. Committees were appointed on By-laws, procuring hall, furnishing hall, etc.

At the next meeting, January 24th, 1852, David Patton applied for membership by demit; a full corps of officers were elected, and a petition for degrees was received from John E. Rosette. The first degree was conferred upon John E. Rosette, William L. Henderson and Benjamin F. Sickles, February 26th, Brothers William L. Henderson and Benjamin F. Sickles received the Master Mason's degree March 10, 1853. The sum of the three degrees was $15.00. A charter was issued to the lodge, bearing the date of October 22, 1852, which still adorns the walls of the lodge room. Hon. A. P. Byall was initiated September 23rd, passed October 21st, and raised to the Master's degree, December 23rd, 1852, being the oldest member, receiving the degrees in this lodge now living. The election of officers under the charter, resulted in Abraham Younkin being elected Master; George W. Springer, Senior Warden; William L. Henderson, Junior Warden, and David Patton, Secretary.

The lodge was formally constituted, and its officers installed, by James A. Kellum, proxy for the Most Worshipful Grand Master, November 29th, 1852. The lodge held its meetings under the dispensation and also under the charter until the summer of 1855, in a frame building, standing on the lot at the northwest corner of Main and Sandusky Streets, then owned by Jonathan Parker, and now the site of J. S. Patterson and Son's dry goods store. Mr. Parker occupied the first floor as a carpenter and cabinet shop. It seems that the Odd Fellows also occupied the same room and a contract is on record of the agreement between these two societies and Jonathan Parker to plaster and finish off the room and pay a rental of twenty dollars a year for same.

In the summer of 1855, a room was secured in "Old White Corner," the building in which the Buckeye Bank is now located. During the year 1863, in the heat of the Civil War, the lodge again moved its quarters, this time to a room in the third story of what was then called the "Joint Stock Hotel building," but now the Glass Block. In 1878 it was moved to the third story of the George W. Kimmell block on the east side of Main Street now owned by William Moss, and in 1893 to the fourth floor of the Rawson block, not far distant, and from there, in 1908, to the fifth floor of the Adams block, corner of Main and Crawford Streets.

The lodge, in its fifty-seven years of its existence, has been presided over by thirty-two Masters, eighteen of whom are still on its rolls. Benjamin F. Kimmons has served the lodge as treasurer thirty-three years in succession, and David L. Grable has served the Lodge faithfully and diligently for the past twenty-two years, as secretary, and it is to him that the author is under obligation for the items of this sketch. The lodge is at present in a flourishing condition, with a membership of 278.

The present officers of the lodge are as follows (1909):

Alex. D. Robertson, Worshipful Master.
William D. E. Snyder, Senior Warden.
George W. Vernor, Junior Warden.
Benjamin F. Kimmons, Treasurer.
David L. Grable, Secretary.
George R. Williams, Senior Deacon.
Samuel I. Good, Junior Deacon.
J. Sterling Downey, Jat B. Holman, Stewards.

William M. Tait, John C. Firmin, John A. Sutton, Trustees.

John A. Gore, Tyler.

Pastmasters and years they served.

Abraham Youngkin, 1852, 1853, 1856.
George Springer, 1854.
Cloyse B. Wilson, 1855.
D. M. Stoughton, 1857, 1860, 1861.
John B. May, 1858, 1859.
W. W. Siddall, 1862, 1863.
Horace D. Ballard, 1864, 1865, 1866.
William Anderson, 1867, 1868.
Daniel B. Beardsley, 1869, 1870, 1871, 1888, 1889.
Milton B. Patterson, 1872, 1873.
Jacob M. Huber, 1874, 1875.
Benj. F. Kimmons, 1876.
Francis W. Firmin, 1877, 1878, 1879, 1883, 1887.
John Parker, 1880, 1890, 1891, 1892, 1893, 1894.
Anthony P. Schack, 1881.
Samuel B. Huffman, 1882.
David L. Grable, 1884, 1885, 1886.
William A. Lear, 1895.
John C. Firmin, 1896.
William S. Parker, 1897.
John W. Chamberlain, 1898.
William M. Tait, 1899.
William M. Martin, 1900.
Daniel Schneider, 1901.
Rufus E. Taylor, 1902.
John A. Sutton, 1903.
George F. Byall, 1904.
John M. Firmin, 1905.
Matthew Martinson, 1906.
Warren B. Keator, 1907.
John A. Gore, 1908.
Alex. D. Robertson, 1909.

FINDLAY CHAPTER, ROYAL ARCH MASONS.

Fifty-five years ago, or in 1854, a chapter of Royal Arch Masons was opened at Findlay, under a dispensation issued by Companion Cooper K. Watson, Deputy Grand High Priest, on March 22nd, 1854, James A. Kellum being appointed High Priest; Abraham Youngkin, King, and William L. Henderson, Scribe. Petitions were received at this meeting from Samuel Huber, D. M. Stoughton, E. M. May and Elijah Snyder. On motion said cases were declared emergent, and the committee were ordered to report forthwith. Reports were made, the ballot was passed and each was declared elected to the several degrees of the Chapter. At this time there seemed to be great interest taken in the Chapter, as the records show that there was a series of meetings held of a protracted nature, as for instance, from day to day, or daily for some time. Six Companions received the Royal Arch degree under the dispensation.

A Royal Arch Chapter was opened May 9th, 1854, and the same was not closed until October 9th of the same year, being "called off," "dispensed with," and adjourned in the interim. A charter was issued October 16th, 1854. Shortly after this boom there must have been a depression, or something to mar the harmony of the Chapter, for in October, 1856, only eleven members were returned, and the grand dues were only $8.50.

The Chapter continued its meetings until March, 1861, when owing to the excitement preceding the Civil War, no more meetings were held until March, 1866, when work was again resumed. With the restoration of peace, there occurred another boom, and they then held what our Methodist brethren would call a protracted effort. Meetings were held every day and night; receiving petitions, balloting upon them the same evening and at special meetings, in a free and easy sort of way, that would have been brought up standing by the Grand Officers in this year of grace.

On March 15th, 1866, H. D. Ballard, B. F.

Kimmons and L. M. Watt were made exalted Royal Arch Masons in the afternoon, and in the same evening D. B. Beardsley, J. M. Ruber and R. F. Bonham received the same degree. B. F. Kimmons is the only surviving member of that day's work, and so far as can be ascertained, only two of those who had received the degree prior to that time are living, and neither of them are members today

During the fifty-five years of the existence of this Chapter, it has had thirty presiding officers, of whom seventeen are still on its rolls. One of these presiding eight years in all. Since 1866, the Chapter has been meeting regularly, and at present is in a prosperous condition, having a membership in September, 1909, of two hundred and six.

FINDLAY COUNCIL.

Findlay Council of Royal and Select Masters was organized July 8th, under a dispensation issued June 19th, 1867, to Companions William E. Snyder, James Wilson, B. F. Kimmons, H. D. Ballard, D. B. Beardsley, J. M. Huber, William Anderson, M. B. Patterson and Isaac Bonham Companions Kimmons and Snyder are still members of the order, while Anderson lives in California. The others have long since passed within the veil, H. D. Ballard being the first to go, having died in July, 1872, thirty-eight years ago.

Companion James Wilson was the first presiding officer. Companion J. P. Woods, who previously practiced medicine in Williamstown, and afterwards became Professor in the Cleveland Medical College, was the first initiate.

On October 12th, 1867, the Council received its charter and was installed under it November 13, 1867. In its forty-two years of life, Findlay Council has had sixteen Masters, one serving nine years in succession. Only three have passed away, the remaining thirteen retain their membership in this Council. There has been a total of 171 members belonging to this council since its formation forty-two years ago, and 120 of them are yet on the rolls and in good standing. At this writing, September, 1909, there are 128 members.

COMMANDERY.

A dispensation for a Commandery of Knight Templars, at Findlay, was issued bearing date April 18, 1889. The first work under this dispensation was the conferring of the Red Cross on Theodore Totten, present postmaster, Robert A. McGeary, William R. McKee and William S. Parker. The first Knight Templar created was Sir James Wilson. Six Sir Knights were made under this dispensation. Application for a charter failed.

January 22nd, 1890, a new dispensation was granted to Sir Knights at Findlay, to form and open a Commandery, to be known as Findlay Commandery U. D. August 21, 1890, a charter was issued to this body and it was numbered 49. It has a steady growth, and now has one hundred and eighty members in good standing. Nineteen Sir Knights have been chosen as commanders of this body, all of whom are living (and except one demitted) and members of this Commandery.

FINDLAY CHAPTER, NO. 23, ORDER OF THE EASTERN STAR.

This was organized under a dispensation January 26, 1894, and was chartered at the succeeding meeting of the Grand Chapter, October 10, 1894. It had a healthy, uniform growth and now numbers 127 members.

THE FINDLAY LODGE OF B. P. O. E.

The Findlay Lodge of B. P. O. Elks No. 75 was instituted in 1888. It started with a few good men, leading citizens of the town, but its growth at first was none too rapid. As time passed, however, new members were taken in and a vast debt was canceled and today it is one of the best lodges for the size of the city in this part of the country. The list of the first officers of the lodge is as follows: Exalted Ruler, J. C. Tritch; Esteemed Leading Knight, W. C. Neibling; Loyal Knight, Edward M. Camfield; Esteemed Lecturing Knight, Geo. L. Cusac; Secretary, S. B. Lippman; Treasurer, A. C. Hick; Tyler, A. B. Crozier; Chaplain, H. E. Hickox; Trustees, V. H. Coons, George Brake, J. H. Boger.

The majority of these original officers are still living and are among the most substantial and honored men of the community. There is at present a membership of over 400. The regular meetings of the lodge are held Thursday nights in their elegantly furnished quarters on the 3rd floor of the Jones Block. The personnel of the membership compares favorably with that of any other like organization in the city and all are endeavoring to exemplify the cardinal principles of the order, to-wit: "The faults of our brothers we write upon the sands, their virtues on the tablets of love and memory."

TRIBE OF BEN HUR.

Ben Hur Court No. 7, Tribe of Ben Hur, was organized in the city of Findlay by D. W. Gerard, now the Supreme Chief, and Dr. H. V. Beardsley, Past Supreme Chief, on the night of February 8th, 1895, with thirty charter members. Professor J. F. Smith, now superintendent of our city schools, was first Chief (presiding officer). Andrew Jackson Fisher was the first Scribe. Since the organization of this court it has made a steady growth and now leads all other fraternal societies in point of number, in the city, having a membership of over four hundred and seventy-eight.

The Tribe of Ben Hur is a social and insurance society, issuing protection in the way of life insurance to its members in amounts ranging from $250 to $3,000. Since its organization to the present time it has paid to the families of its members in this city, over $40,000.

The officers at this time are: Past Chief, I. N. Latchaw; Chief, N. W. Bright; Judge, Mrs. E. E. Wilson; Teacher, Mrs. H. V. Beardsley; Captain, J. F. Reynolds; Guide, Mrs. N. J. Miller; Keper of Inner Gate, Frank Bryan; Keeper of Outer Gate, W. S. Mays; Scribe, F. M. Barnhart; Keeper of Tribute, N. J. Miller; Resident Managing Deputy, Dr. H. V. Beardsley. They hold meetings every Tuesday night in Ben Hur Hall on North Main Street.

DAUGHTERS OF AMERICA.

The Daughters of America is a purely patriotic benevolent organization of native born Americans, existing for the protection of Americans and American institutions and the promulgation of a spirit of patriotism throughout the length and breadth of our country. Love of country and the protection of its institutions is the platform on which it stands. Its objects are to maintain and promote the interests of Americans and shield them from the depressing effects of foreign competition. To assist Americans in obtaining employment. To encourage Americans in Business. To establish a sick and Funeral Fund. To maintain the public school system in the United States of America and to prevent sectarian interference therewith and uphold the reading of the Holy Bible therein. To oppose sectarian interference with State and National affairs. To assist in advancing the objects of the Jr. O. U. A. M.

Golden Rod Council No. 34. Daughters of America was instituted at Findlay, Ohio, in 1895, with twenty-nine charter members, as follows: L. E. Kennedy, Nelia B. Kennedy, C. R. Cameron, Donella Greenly, C. M. Ball, Mrs. J. S. Ball, Mrs. R. W. Bennet, A. T. Spitler, Mary Spitler, Clara Crall, Eliza Fellabaum, O. S. Ball, Lizzie Gibson, L. Walters, Sallie Keefer, J. C. Folk, S. S. Folk, Eva Ball, Bertha M. Ball, Mrs. H. M. Feefer, Lou Doll, S. A. Gressley, Julia A. Moyer, Lissa Loyd, J. A. Loyd, Katie O. Carpenter, Viola Stump, Julia Saltsgaver, A. M. Wilbur. The following are the present officers: J. O. C., Louisa Merick; A. J. P. C., Dora Yerger; C., Kate Carpenter; A. C., Kate Arnold; V. C., Anna Teal; A. V. C., Anna Barnhart; R. S., Ida Fletcher; F. S., Mary Aksam; Treas., Eliza Deihlman; Com., Margurite Binley; Ward., Mabel Werts; I. S., Mayme Shelden; O. S., L. E. Kennedy; Trustees, D. S. Davis, Mrs. Margaret E. Fassett, L. E. Kennedy; Pianist, Lillian Pease; Deputy, Ida Fletcher; Rep., Dora Yerger; Capt., Irene Thomas.

THE GRAND ARMY OF THE REPUBLIC.

The First Post.

The first Grand Army Post in Hancock County, and among the first in northwestern Ohio, was organized in Findlay in 1866. It began with a membership of about fifty. The records of that post have been lost and no exact dates can be given. From the memory of some of those who were charter members we learn that among its members were: James A. Bope, Fred Worsley, M. B. Walker, Edwin Parker, Thomas Scott, William Vance, Samuel C. Moore, Samuel Huber, Jacob Huber, C. P. Vail, Albert Parker, E. T. Dunn, John C. Martin, Theodore Totten, James Wilson, William Didway, Lafayette Kring, E. P. Sterner, Jacob Gassman, J. H. Goodwin, Martin L. Duttwiler, Frank Biggs, William Biggs, John Adams, Christ Galloway, William Hallowell, William DeHaven and William O'Harra.

Its commanders were the following persons in the order named: James A. Bope, William Vance, E. T. Dunn, M. B. Walker. This post surrendered its charter soon after the spring election in 1871.

STOKER POST.

In the early spring of 1881 a number of old soldiers concluded to organize a Grand Army Post and avoid the rocks upon which the former post had been wrecked.

On the 7th day of April, 1881, a meeting of the Union soldiers of the Civil War was called and they assembled in what was the Armory—rear of the second story of the Wheeler building, on the ground now occupied by the Jones Block, corner of Main and Crawford streets. The following ex-soldiers signed the roll as charter members: William Mungen, J. M. Huber, J. A. Kimmell, C. P. Vail, Thomas B. Scott, J. A. Coons, J. W. Whitehurst, M. L. Duttwiler, R. F. Pollock, H. H. Metzler, M. L. Tisdale, Elisha Edwards, R. Timmerman, E. Parker, Joseph Gutzweiler, J. W. Davidson, S. Howard, C. E. Galloway, Rufus Fellers, L. H. Perry, David Joy, J. W. Davis, William Biggs, John Adams, T. C. Wertz, J. C. Cummins, J. M. Cherry, John Peet and William Didway.

The post was instituted by Colonel Lowenthal, S. M. O., of Toledo, Thursday evening, April 7th, 1881. On motion of Capt. John Adams the organization was named Stoker Post in honor of Cyrus and David Stoker, brothers, and late members of Company F, Twenty-first Ohio Volunteer Infantry, who were both killed in the battle of Stone River in January, 1862.

After some remarks by the comrades the following officers were elected: Post Commander, Martin L. Detweiller; Senior Vice Commander, R. F. Pollock; Junior Vice Commander, H. H. Metzler; Adjutant, J. M. Beelman; Quartermaster, C. E. Galloway; Surgeon, J. A. Kimmell; Chaplain, William Mungen; Officer of the Day, L. H. Perry; Officer of the Guard, William Biggs: Sergeant Major, T. C. Wertz; Quartermaster Sergeant, Rufus Fellers; Aid-de-camp, John Adams; Assistant Inspector, William Didway.

The following is a list of commanders from the organization to the present time: M. L. Dutweiler, April 7, '81 to Jan. 9, '82; M. L. Dutweiler, Jan. 9, '82 to Jan. 10, '83: H. H. Metzler, Jan. 10, '83 to Jan. 9, '84; James Wilson, Jan. 9, '84 to Jan. 14, '85; James Wilson, Jan. 14, '85 to Jan. 13, '86; George L. Arnold, Jan. 13, '98 to Jan. 12, '87; U. H. Grable, Jan. 12, '87 to Jan. 11, '88; James A. Bope, Jan. 11, '88 to Jan. 5, '89; J. A. Thomas, Jan. 5, '89 to Jan. 8, '90; W. J. Morrison, Jan. 8, '90 to Jan. 9, '91; W. J. Morrison, Jan. 9, '91 to Jan. 6, '92; N. M. Adams, Jan. 6, '90 to Jan. 4, '93; Theodore Totten, Jan. 4, '93 to Jan. 3, '94; J. T. Bolton, Jan. 3, '94 to Jan. 9, '95; Solomon Funk, Jan. 9, '95 to Jan. 1, '96; B. L. Byal, Jan. 1, '96 to Jan. 6, '97; C. C. Clark, Jan. 6, '97 to Jan. 12, '98; M. D. Hewitt, Jan. 12, '98 to Jan. 11, '99; W. H. Werner, Jan. 11, '99 to Jan. 3, 1900; W. G. Bond, Jan. 3, 1900 to Jan. 2, '01; J. P. Woods, Jan. 2, '01 to Jan. 1, '02; M. L. Tisdale, Jan. 1, '02 to Jan. 7, '03; E. T. Dunn, Jan. 7, '03 to Jan. 14, '04; E. T. Dunn, Jan. 14, '04 to Jan. 11, '05; T. T. Dunn, Jan. 11, '05 to Jan. 10, '06; E. T. Dunn, Jan. '06 to Jan. 2, '07; E. T. Dunn, Jan. 2, '07 to Jan. '08; I. B. Arnold, Jan. '08 to Jan. '09; E. T. Dunn, Jan. '09 to Jan. '10.

The membership at this date (Aug 6, '09), is two hunderd and nine. The Post is well attended and is in flourishing condition. The most notable event in the history of the Post was the securing and holding of the department encampment in 1900. A detailed account of this may be found on the Post records. It was by far the best arranged, best equipped, best managed and most satisfactory department encampment held in Ohio to that date.

THE W. C. T. U.

The Woman's Christian Temperance Union is the outgrowth of the "Women's Crusade," a remarkable uprising of the women against the liquor traffic, which began in Hillsboro, Ohio, Dec. 23, 1873, and spread throughout Ohio and Pennsylvania. The methods of the movement were the holding of prayer-meetings in the churches, from which went forth "Praying Bands" to the saloons, where they read the Bible, sang hymns and prayed. In Hancock County Mrs. S. A. Strother lead the band of women who met in the old Methodist Church and marched down the street singing hymns and even entering the saloons, kneeling in prayer on the sawdust covered floors. In some instances the saloon-keepers agreed to close their places of business and poured out their stock of liquor.

The organization resulting from the Crusade was first known as the Ladies' Temperance League of Hancock County. The first president of the League was Mrs. M. C. Whitely; the first chairman, Mrs. S. A. Strother; first corresponding secretary, Mrs. Chas. E. Niles; recording secretary, Mrs. Squire Carlin; treasurer, Mrs. Caroline Gage. Mrs. Jones, wife of the Methodist minister, was the first president of the Findlay League. The first local "Women's Christian Temperance Union" was founded in Fredonia, N. Y., in Dec. 1873. The first State Union was founded in Ohio in 1874.

Since that time the organization has spread until today the White Ribbon encircles the globe in fifty-two countries and its influence has been widely felt in legislatures and in elections in which prohibitory laws have been voted upon. Notably the grand victory of the Temperance forces at the polls on November 16, 1908, in which the county gave the grand majority of nearly 2,000 votes in favor of decency and public morality, was due in large measure to the ceaseless and untiring labors of the Woman's Christian Temperance Union.

In 1898 the Women's Christian Temperance Union published a paper which was called "The Union," this contained much interesting temperance news, and was ably edited. At that time Mrs. S. A. Strother was President of the Hancock County Union and was instrumental in bringing many noted speakers to Findlay, among whom were Francis Murphy, of pledge-signing fame, Miss Francis Willard, Miss Yeomans, Mrs. Mary Woodbridge's Mattie McClellan Brown, Mrs. Mary A. Livermore, Mrs. Tathrop, Mary Hunt, author of Scientific Temperance Instruction in the Schools. Gov. St. John, John G. Wooley, John B. Gough, and others. The meetings were then held in the old Court House on Sunday afternoons and were largely attended by both men and women, among the early members were the following: Mrs. M. C. Whitley, Mrs. Sarah Strother, Mrs. Charles Niles, Mrs. M. Y. Detwiler, Mrs. M. B. Porch, Mrs. Cordelia Spathe, Mrs. S. H. Darst, Mrs. Phil Morrison, Mrs. Rice, Mrs. Hill, Mrs. J. W. Danelson, Mrs. Julia Rockwell, Mrs. Delilah Robinson, Mrs. Mary Robinson, Mrs. William Vance, Miss Mary Reddick, Mrs. John Meeks, Mrs. E. Barnd, Mrs. R. Sheets, Mrs. G. G. Mosher and Miss Jenie Sours.

A loyal Temperance Legion had been organized by Mrs. Julia Rockwell and held their meetings in the old White Corner.

Among the things done by the Woman's Christian Temperance Union was the obtaining of a ten o'clock closing ordinance, a curfew law, a law against obscene pictures on bill boards, etc. The establishment of a reading room, etc.

About fifteen years ago a Rescue Home, called The Door of Hope, was established on West Front St. This was closed not long after through lack of interest and lack of funds.

In those early years the Woman's Christian Temperance Union was not the popular organization that it is today, but the noble women labored in their efforts to uplift and better humanity, undeterred by the slights and insults which they not infrequently received.

There are forty-four distinct departments of work connected with the organization, which is thoroughly systematized, the same principle and methods generally prevailing from the local to the World's Union, a department of Peace and Inter-national Arbitration, co-operates with all the other peace societies of the world. There is also a department of Mercy, which opposes vivisection and inculcates kindness to all sentient beings. The requisites for admission to the Union are payment of annual dues and signing of the pledge.

HANCOCK COUNTY AGRICULTURAL SOCIETY.

On the 30th day of August, 1851, a number of farmers and friends of agriculture congregated at the Court House and after discussing the project of organizing a society, adjourned until the first Saturday in October, at which time an organization was effected. The first fair was held on October 15, 1852, on rented grounds north of the river, on what was known as the Brunner brickyard.

On February 9, 1859, eight acres of land in East Findlay lying in the northeast corner of Blanchard Street and Blanchard Road, was purchased of J. H. Williamson for the consideration of $800. The first fair on the new ground was held Oct. 5, 6, and 7, 1859.

May 20, 1868, the old fair ground was sold to Samuel Hoxter for $1,750 and a new site purchased of Timothy Russell and John Powell for $3,000. This new location was situated on South Main Street about one mile south of Sandusky Street and comprised of 29.40 acres.

The first fair was held on the newly purchased grounds Oct. 1, 2 and 3, 1868.

On the 11th day of June, 1890, the county commissioners sold the beautiful grove on South Main Street to O. A. Ballard, A. H. Balsley, Geo. Cusac, F. H. Clessner, Adam Fulhart and Lemuel McManness for $26,500. These beautiful grounds, comprising a portion of the east half of the southeast quarter and part of the west half of the southeast quarter of Sec. 24, Township one North, Range 10 east, was one of the most beautiful in the State and on these grounds the Agricultural Society had many fairs successful, both financially and socially. But $26,500 was a tempting morsel to the county and the same was accordingly sold.

July 6, 1891, the county commissioners purchased the north part of the northeast quarter of Sec. 36, Township 1 north, Range 10 east, of J. G. Hull for $10,500. This tract is situated about one mile farther south than the old grounds and consists of a large farm of 70 acres having sold 6.30 acres August 31, 1891 to Theodore Gibson for $925.57.

After the new fair grounds were paid for, the balance of the sale money was used in improving the grounds and not only was the amount, $15,925.57, used in improvements, but one-fourth of a mill of a blanket tax was levied over the entire county in 1893 to help replenish the funds of the agricultural society; besides the county commissioners set aside various amounts at divers times from the dog fund to help along the good cause.

From the time of taking possession of the new grounds in 1891 the society have held a fair annually with general good success in their exhibitions of live stock, grains, fruits and vegetables, implements and buggies and carriages, poultry, and produce of the farm and garden in general, together with articles of domestic manufacture and merchandise.

A good race track was constructed and the speeding was a source of enjoyment to many of our citizens. Large crowds met from all parts of the county and exchanged business views and social courtesies, thus affording an opportunity to our farmers to not only become better acquainted with each other but to improve their knowledge of the ancient and honorable vocation of farming and stock-raising, and while it afforded them and their families a day of outing and annual picnic, as it were, they were vastly profited and pleasantly entertained.

The last exhibit—that of 1909—was considered the best on the present grounds, both in attendance and display of articles, and the board will be able to pay all their premiums with a balance remaining in the treasury, notwithstanding more money was expended in premiums than was ever before paid out in any previous fair held in Hancock County.

The present officers of the Association are: President, Marion Bell; vice-president, Theodore Powell; treasurer, J. M. Reed; secretary, R. V. Kennedy. The bounding success of this year's fair was owing to the indomitable energy of the above mentioned gentlemen, and especially to the incessant care and labor of the secretary, Mr. Kennedy.

CHAPTER XIII.

CHURCH HISTORY.

The Pioneer Preacher—Hardships Endured—Small Salaries—Progress of the Various Denominations in Hancock County—Churches of Findlay and Hancock County.

When the first circuit rider lifted up his voice in this region, exhorting all to "flee from the wrath to come," this region was still a wilderness. The sweet and sacred story of the cross was told and re-told beneath the sturdy oaks of the forest, and the four-footed denizens of the wild paused and listened to the first hymns that soared heavenward from the lips of the little band of worshippers. The scented groves of that day were truly "God's first temples."

One of the first, if not the first minister to enter the forest of Ohio was Charles Frederick Post, a Moravian missionary, a calm, simple-hearted and intrepid man. He was sent into Ohio after the defeat of Braddock to preach the gospel, as well as to win the Indians over to the cause of the English; and he zealously did both. He was assisted in his labors by the celebrated Heckenwelder, and afterward by David Zeisberger, another devoted servant of God, and the three founded the town of Gnadenhutten, which was afterward destroyed by a lot of fanatical white settlers and its Indian converts massacred.

It was not until after the close of the Revolutionary War that the tide of pioneer preaching reached the real valley of the Ohio. It swept northward from Kentucky, headed by the good, old itinerant, who rode from settlement to settlement with Bible and saddlebags, preaching wherever he could find a congregation. He did as much to civilize the wilderness as those who wielded the axe and built towns where naught but the unbroken forest had been.

Strong and powerful men were the backwoods preachers and their mentality was equal to their physical strength. They knew no fear, but set up the altar of the Most High God in the most remote localities, undaunted by adverse circumstances and surrounded by dangers seen and unseen. For the ministry of the church of the wilderness assumed the position and responsibility of their calling under the confident belief that each man of them was specially called and sent forth by the Holy Spirit of peace and power as the ambassador of Christ.

The office of the backwoods preacher was no sinecure. His field of labor was the world. His salary rarely exceeded seventy dollars per year. Nothing more was allowed a man with a wife than without one, for it was understood by those of the old church that a preacher had no business with a wife and that he was a great deal better without. They came to the wilderness to face perils, want, weariness, unkindness, cold and hunger. The bare earth in winter and summer was three-fourths of the time their bed, a saddle their pillow and the sky their coverlet.

They studied the hymnbook nearly as devotedly and constantly as the Bible, and with these two they had an arsenal from which they could bring forth weapons adapted to every emergency. When some obstreperous sinner disturbed their meetings they strode down from the backwoods pulpit and ejected the offender by main force, after which the sermon was resumed as if nothing had happened.

These pioneer men of God not only knew the Bible, but they knew other books as well. Young and Milton were their intimate companions. Miltonic descriptions of perdition abounded in their discourses, and the judgment, with all the solemn array of the Last Assize was vividly depicted by them. Their rather topographical descriptions of the good and bad worlds were received with favor by their audiences. The earnest and strenuous lives of the settlers, beset with necessities and filled with the struggle to supply them, demanded strong religious nourishment, and these simple-hearted, firmly believing crusaders of the wilderness were just the men to give it to them.

Between these heroic men of different denominations there was for some time much antagonism. Thy were too earnest to make light of even the least jot or tittle of their respective creeds, and their earnestness resulted in much pugnacious rivalry. They were great controversialists and there was a resounding din about Baptism and Pedo-Baptism, Free Grace and Predestination, Falling from Grace, and the Perseverance of the saints; but at no time did the pioneer preachers forget the holiness of their mission.

The true worth of the pioneer preacher cannot be computed. He did a great work among the early settlements through all this region. He builded up little congregations which in time grew into strong, light-spreading churches. He visited the sick, comforted the mourner, prayed with the dying, and often read the burial service to the howl of the predatory wolf. He appeared as an angel of light to the little family around the pioneer hearth. And when his sacred work was ended he "folded the drapery of his couch around him" and, secure in the great reward which was to be his, bowed to the will of God and passed from the stage of action.

While now nearly every denomination and sect have representatives in Hancock County, in the early days, they were principally Methodist, Presbyterian, Baptist and Lutheran. Now all of the different denominations, both in town and country, have comfortable and in most instances even beautiful houses of worship, far different from the hewed log meeting houses of former days. Even the churches in the small towns and country have their accessory and auxiliary societies and are fully up to the times in all that pertains to the conduct of a well regulated society.

As early as 1832, the Methodists began to hold regular meetings in the county, and this denomination is still in the ascendancy as to numbers and influence. The first church in Hancock County was organized at the home of John Dukes in Blanchard Township, and a church built in 1831, which is still known as "The Duke's Church." The first preacher in

Hancock County was James Gilruth, who came to Findlay in 1822. Next in order was the Presbyterian Church, the first preacher of which was the Rev. Barr, who came in 1829, and organized a bible society, with Wilson Vance, Edwin S. Jones and John C. Wickham as directors.

The Lutheran Church was the third to permanently locate in this county, beginning regular services in 1839, but not having permanent organization until 1846.

St. Michael's Roman Catholic Church was organized in 1851, and built a small frame church on the corner of West Hardin and Cory Streets, although occasional services had been held here since 1840. Late in 1866 the building, together with the parish school building adjoining, burned down, and, as the membership had increased largely, more ground was needed. Louis Adams, then one of our most substantial citizens, kindly donated the present site on West Main Cross Street, together with half the cost of the sweet sounding bell now in the tower of the church building.

The present building was completed in 1867, though it has been much improved and enlarged since then. The parochial schools are located just west of the church and consist of a very permanent building of six rooms and a large hall occupying the entire third story, where entertainments are often given. These schools are presided over by a competent corps of Sister teachers. The Roman Catholic church in Findlay is the only one in Hancock County.

The German Evangelical Lutheran Church, was organized in 1858, and built their church edifice on West Front Street, which they first occupied about 1863. They have a very flourishing society of our best German citizens, which has been largely increased by the strenuous effort of the present pastor, the Rev. William G. Dressler.

The United Brethren Church of Findlay was organized in 1853. They erected a small brick building on West Crawford Street, in 1855, but have been prosperous, and at present occupy a modern edifice on West Hardin Street.

The First Baptist Church was organized in 1857, but did not build a church until about 1888-9; there were no services held for several years; they now have a comfortable building on East Lima Street.

The Trinity Episcopal Church was organized in 1881, and at once built a handsome though moderate structure on West Hardin Street opposite the United Brethren Church.

The Church of Christ, better known as Disciples, organized in 1884 and built a very commodious structure on corner of North Main and Filmore Streets. They have a large membership and are very lively workers in the cause in which they place their faith.

The Evangelical Association was organized in 1870, with Rev. E. B. Crouse in charge, and a brick building erected on East Sandusky Street. Later a split occurring in the general church, extended to Findlay, and caused the building of another church on West Sandusky Street. The dispute seemed to be between two of the most prominent elders of the society and extended down to the membership.

The Church of God have had organizations in the county since 1848, but they did not grow very strong numerically until quite a late date, getting their main impetus from the location of their college here in 1881, which greatly increased the interest in that organization. The First Church of God on West Front Street is a strong organization, and they have a very commodious as well as handsome building. The College church meets in the chapel of the college and is usually presided over by the president of the college or some of the faculty.

The Third M. E. Church, in the Reck Addition, was dedicated on July 22nd, 1889.

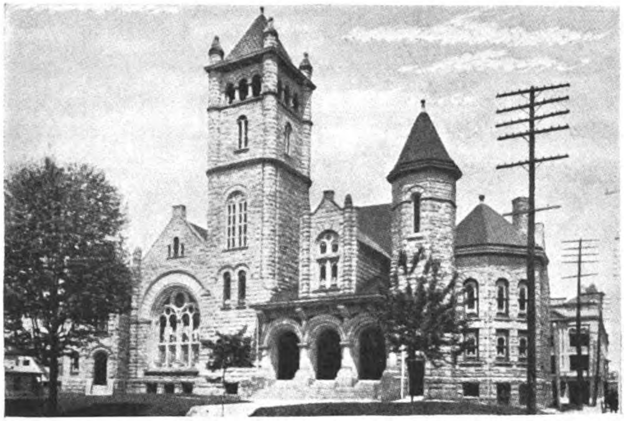
FIRST M. E. CHURCH.

In 1829 Adam Poe, a presiding elder from the Wyandot Mission at Upper Sandusky, came one Saturday evening, to the little village called Ft. Findlay and announced that he would preach the next morning in the school house. The villagers came to hear him. Other missionaries came from Upper Sandusky and in three years a separate mission was established, with seventeen members, seven of whom were named Baker. By 1836 Fort Findlay had become the center of Findlay circuit with Rev. H. Whitman, preacher in charge, and Rev. G. W. Breckenridge, assistant. A church was built on East Main Cross Street, at a cost of $700.00, and later, a parsonage on the same lot. In 1850, at its own request, the society was made a station, and Rev. W. S. Lunt appointed pastor. During this year a new brick structure was built on the north end of the lot now occupied by the present structure, but on account of a deficiency in the foundation, the walls cracked and it was considered unsafe. The membership increased so rapidly that in ten years an agitation began for the erection of an adequate building.

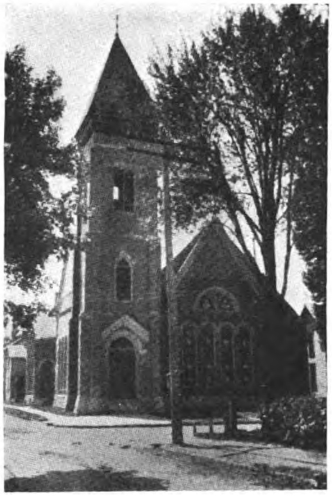
In spite of mercenary hindrances, because of the war, $1,500.00 was subscribed, and in 1866, under Rev. J. W. Wykes, pastor, the corner stone of the third building was laid. Funds increased marvelously till at its completion, while Rev. Isaac Newton was pastor, Findlay boasted of a very fine building valued at $33,000.00, a great part of the debt of which was paid during the pastorate of Rev. P. P. Pope. The church now entered upon a time of great prosperity. After the extension of the time limit from two to three years, four pastors remained the full three years each. When Rev. A. J. Fish was pastor, came the natural gas boom which increased the population of the town from five to eighteen thousand. A great number of Methodist families came to Findlay at this period, the outcome of which was the establishment and building of the Howard M. E. Church on Cherry Street at a cost of about $8,000.00. Also a lot was purchased by the First M. E. Church on West Sandusky Street, and a commodious parsonage was built. In 1900 a fire occurred in the First M. E. Church building, rendering it untenable and the congregation decided to take it down and rebuild.

Under the administration of the Rev. C. R. Havighurst, who remained with the congregation for a period of eight years—the longest in the history of the church—the new and beautiful edifice was built and dedicated December 7, 1902, at a cost of about $75,000.00. The structure is of Craig sandstone, and is one of the most attractive and impressive church buildings in the conference. Under the suggestion and management of the present pastor, Rev. G. B. Wiltsie, the first Sunday in June, 1909, was devoted to the celebration of the eightieth anniversary of Methodism in Findlay. All the former pastors living were invited, many of whom gladly returned and noted with interest the splendid prosperity of the church, both financially and spiritually.

Prior to 1850 the church was served by missionaries and circuit preachers, since then the following have been pastors:

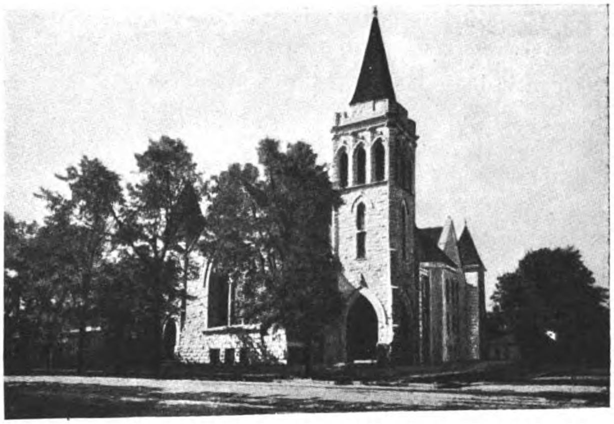


FIRST M. E. CHURCH, FINDLAY



CHURCH OF GOD, FINDLAY

CATHOLIC CHURCH, FINDLAY



FIRST PRESBYTERIAN CHURCH, FINDLAY

W. S. Lunt, J. A. Kellum, G. Gray, J. S. Holmes, T. Parker, L. B. Gurley, G. Lease, J. S. Kalb, J. Wykes, Isaac Newton, O. Kennedy, Wm. Jones, I. R. Henderson, P. P. Pope, J. F. Davies, E. D. Whitlock, W. A. Yingling, S. L. Beiler, A. J. Fish, L. E. Prentiss, C. R. Havighurst, J. M. Avann, W. G. Waters, H. C. C. Jamisen, C. O. Crist, G. B. Wiltsie

The present number of communicants of this church is about 775, and the enrollment of the Sabbath school is about 900.

HOWARD METHODIST EPISCOPAL CHURCH OF FINDLAY.

The development of Findlay in "Boom days" led to the building of the Howard Church. Methodism had been established in Findlay for half a century when the growth both of the city and of the First Methodist Church made a new church seem advisable. Under the pastorate of Dr. A. J. Fish at the First Church the first steps were taken by securing two lots in Cherry Street near Clinton, which were held while money was raised for the building The corner stone was laid in December, 1887, and the building was soon enclosed. The church was dedicated July 16, 1888, by Dr. J. W. Hamilton of Boston, now a bishop in the Methodist Church. The following pastors have served the church: Dr. H. C. Jameson, '88; Dr. N. B. C. Love, '89, '90, '91; Dr. C. W. Taneyhill, '92, '93; Rev. S. L. Boyers, '94, '95; Rev. J. W. Holland, '96; Rev. M. C. Howley, '97, '98, '99; Rev. Peter Biggs, 1900, '01, '02; Rev. J. Baumgardner, '03 to '07; Dr. Merrick E. Ketchem, '09, present pastor.

During the pastorate of Rev. S. L. Boyers the debt on the building was paid off. During the pastorate of Rev. J. Baumgardner a parsonage was secured adjoining the church. The church had a steady growth and at the present time (1909) has 350 members with a Sunday School of about 300 enrollment. The Epworth League has some 75 members. The membership is loyal and earnest in service and the church is accomplishing splendid results.

THE FIRST CHURCH OF CHRIST, FINDLAY.

The First Church of Christ at Findlay was organized December 14, 1884, by W. J. Lhamon then of Kenton. Previous to this U. M. Browder, M. Riddle, Alanson Wilcox, W. J. Lhamon and perhaps others preached occasional sermons. W. J. Lhamon held a meeting of several days in December, 1884, which resulted in the organization of the church. The Nineteenth District of the Ohio Christian Missionary Society helped to bear the expenses of the meeting. The following were the charter members of the new church: A. A. Dillinger, Katharine Brogee, Henry C. Lanning, Agness Shank, Hannah Ross, Mary E. McFarland, Lizzie Pendleton, Elizabeth Henry, Rhoda Lanning, Mary A. Shank, Lavina Hartman, Fannie Dillinger, Ella Shank, May Shank, Orpha L. Humason, Margaret Thomas, Cordeli Shank, Kate M. Kagy, Sophia Kibler, Susan Powell, Lavina Shank, John C. Shank, John S. McFarland, Metta Phifer, Hannah Corwin, Sophrona Bacher, Adaline D'Brant, Henry Shank, Jr. The first meetings were held in the German Reform Church on East Main Cross Street. In 1887 a substantial brick veneer building was erected at the corner of North Main and Fillmore Streets. It seats four hundred. A frame structure for Sunday use has since been added. The house was dedicated in October, 1887, by F. M. Rains, secretary of the Foreign Christian Missionary Society. At the organization the following persons were made a committee of management till officers could be chosen: Henry C. Lanning, Henry Shank, Jr., A. A. Dillinger, Kate M. Kagy, Hannah Ross, and Orpha Humason. The first two or three years the church had no resident pastor but was ministered to occasionally by W. J. Lhamon of Kenton, Dr. S. M. Cook, then of Bays, and others. J. T. H. Stewart was the first settled minister. The house was built during his ministry. The church has had twelve resident pastors, J. T. H. Stewart, 1887 to July 29, 1888; A. B. Moore, August 5, 1888 to July 1, 1889; T. A. Cooper, July 14, 1889 to July 5, 1891; B. J. Sawyer, October 6, 1891 to February 2, 1892; P. J. Rice, June 1, 1892 to December 24, 1893; Eugene Brooks, January 1, 1894 to September 1, 1896; G. W. Weimer, October 6, 1896 to October 1, 1897; J. W. Adams, November 1, 1897 to November 1, 1898; A. M. Growden, January 1, 1899 to April 15, 1903; J. F. Stone, July 12, 1903 to July 12, 1904; C. H. Bass, October 1, 1904 to October 1, 1907; and the present incumbent, John Mullen, whose ministry began November 10, 1907. The church has made splendid progress. Hundreds have been added to the membership but owing to the unsettled condition of our city's population in the past there have been heavy losses by removal. The present membership is four hundred and fifty. The Sunday School enrolls about four hundred. The Y. P. S. C. E. has sixty members and the Christian Women's Board of Missions Auxiliary nearly fifty. The church supports a missionary, D. O. Cunnigham, in India. One hundred and sixty-four members have been received into the church the past twenty months. E. C. Taylor is chairman of the official board. Dr. E. C. Miller is superintendent of the Sunday School.

The Official Board is composed of Dr. E. C. Miller, T. M. Sherman, G. N. Abbott, John Mullen, Elders; E. C. Taylor, P. S. Latchaw, H. C. Miley, J. W. Irwin, W. E. Deitzel, J. Z. Chase, G. R. Miller, F. L. Powell, Deacons.

UNITED BRETHREN IN CHRIST.

The Church of the United Brethren in Christ, which is the oldest denomination of purely American origin, began its existence about 1768, when Rev. Martin Boehm was preaching to a large congregation assembled in Isaac Long's barn in Lancaster County, Pa. He preached with great power, and Rev. William Otterbein being in the congregation, greatly delighted, stepped forward at the conclusion of the sermon, and embracing Boehm, exclaimed: "Wir sind brueder,"—"We are brethren," which gave rise to the name of the denomination. The work grew, converts were organized into classes, finally the church was organized forming this new denomination with its first formal Conference in Rev. William Otterbein's parsonage, in Baltimore, in 1789. Its government is much like the government of the United States of America. Its ecclesiastical bodies are General, Annual and Quarterly Conferences.

As to the history of the local church of The United Brethren in Christ, the records accessible are very meager. Prior to 1854, religious services were occasionally held by United Brethren people, in a little brick schoolhouse on West Front Street. The following trustees, Henry Hartman, Nimrod Bright, Joel Pendleton, Jesse Wheeler and J. T. Crites, raised funds by subscription, and early in 1854, Lot 78, corner of West and Crawford Streets, was purchased and a brick church was completed in 1855, under the direction of Rev. Chester Briggs, pastor. This property was sold in 1887, and a lot was purchased on the corner of West Hardin and South Cory Streets, where the present church edifice was erected and first occupied in 1889 under the pastoral care of Rev. G. L. Bender with the following Board of Trustees: D. R. Stoker, R. C. Bennett, L. C. Clark, G. A. Carpenter and Isaac Hershey.

The following ministers served the church beginning with the year 1854:

Reverends Chester Briggs, Michael Long, William Mathers, —— Case, —— Dunn, Percy Moore, John French, Alvin Rose, Reuben French, William Glancy, T. J. Harbaugh, T. D. Ingle, James Long, M. Shestler, A. W. Holden, G. P. Macklin, E. A. Starkey, J. Kirk, Isaac Crouse, S. H. Radebaugh, 1885-87; G. L. Bender, 1887-90; E. B. Maurer, 1890-91; P. N. Gardner, 1891-92; J. H. Arnold, 1892-96; C. N. Crabbs, 1896-99; C. B. Fletcher, 1899-01; A. M. Smith, 1901-04; J. W. Lilly, 1904-05; A. W. Ballinger, H. H. Rangeler, 1905-06; O. F. Laughbaum, 1906-09.

FIRST PRESBYTERIAN CHURCH OF FINDLAY.

This church was organized December 21, 1830, the following being the charter members: William Taylor, Margaret Taylor, Phoebe Henderson, Asa Lake, Mrs. Chloe Lake, Ebenezer Wilson, William Cowan, Sarah Cowan, Mary Gibson, Wilson Vance and Sarah Vance. A part of the minutes of the first meeting are worthy of a place in this sketch. The following resolutions were then offered and unanimously adopted:

First, In order to obtain and enjoy Christian fellowship and communion and to enjoy the means of grace, and to have the Word and ordinances of the Gospel administered in a regular and orderly manner for our spiritual nourishment and gowth in grace and for the general promotion and advancement of the cause of the Redeemer.

Secondly, Resolved: That we unite as a Church of the Lord Jesus Christ in connection with the Presbyterian Church of the General Assembly, mutually engaging to be subject to one another in the Lord, to walk together according to the Gospel, and to study the things that make for peace and the things whereby we may edify one another.

At the same meeting William Cowan and Ebenezer Wilson were elected Ruling Elders. This was the first Presbyterian Church organized in this part of Ohio. The first home of worship was erected in 1836 at the corner of East Crawford and Mechanic Streets and used for twenty-one years. The next building was erected in 1857 at the corner of South Main and East Hardin Streets (now a part of the Donnell Block) and was dedicated December 27th of the same year.

The corner stone of our present church home was laid September 25, 1900, and the completed edifice was dedicated to the service of God, September 29, 1901.

The following is a list of pastors and the term of office: Rev. Peter Monfort, 1830-1833; Rev. Thomas Clark, 1833-1834; Rev.

Peter Monfort, 1834-1835; Rev. George Van Eman, 1835-1841; Rev. Simon Peck, 1841-1842; Rev. R. H. Holliday, 1842-1854; Rev. John A. Meeks, 1855-1865; Rev. J. M. Cross, 1865-1869; Rev. A. B. Fields, 1869-1872; Rev. Ebah Muse, 1872-1875; Rev. R. R. Sutherland, 1876-1881; Rev. John C. Watt, 1881-1885; Rev. Joshua R. Mitchell, 1885-1898; Rev. John Montgomery, 1899-1906; Rev. Lester S. Boyce, 1907——.

The following is a list of the elders and date of election: William Cowan, December, 1830; Ebenezer Wilson, December, 1830; Samuel Moorhead, November, 1835; John Ewing, November, 1835; William Taylor, August, 1837; Frederick Henderson, August, 1837; John Burns, August, 1837; Paul Sours, November, 1844; Milton Gray, October, 1865; Emanuel Miller, October, 1865; Phillip D. Bigelow, 1866; Joseph S. Patterson, 1866; W. A. Ward, December, 1868; Presley N. Lyle, April, 1870; Isaac Davis, April, 1870; Henry Byal, April, 1870; Jesse Guise, April, 1870; George L. Arnold, January, 1886; John Shuck, January, 1886; Robert M. Abbott, December, 1888; John Q. Codding, December, 1888; David B. Cratty, December, 1888; Charles H. Lambie, November, 1897; Silas E. Hurin, November, 1897; William H. Loy, June, 1905; Jeston Warner, June, 1905.

Present Organization: Pastor, Rev. Lester S. Boyce, The Manse, 203 East Sandusky St.

Elders: Joseph S. Patterson, George L. Arnold, John Schuck, John Q. Codding, Clerk, David B. Cratty, Silas E. Hurin, William L. Loy, Jeston D. Warner.

Board of Trustees: George L. Arnold, Charles W. Patterson, Leonard C. Glessner, William S. Bish, Harmon McEowen, Ephraim H. Adams.

Financial Secretary, Harmon McEowen. Congregational Clerk, Ross Wetherald. Treasurer, William H. Loy. Choir Leader, Harrold A. Wakefield. Organist, Edna V. Bigelow. Sexton, Jonathan J. Miller, 115 West Lincoln St. Church membership, 510. Sunday School enrollment, 327.

FIRST UNITED PRESBYTERIAN CHURCH, FINDLAY.

This congregation is the result of Home Missionary effort by the denomination at large. The first steps toward the organization of a United Presbyterian Church in this place were taken by Rev. J. C. Roe, of Kenton, O. The organization was effected March 31, 1890. Of the charter members only one remains in the present membership of the church, Miss Elizabeth Allison. In all a large number of members have been received. Losses by death and removal leave the present roll of members at about one hundred.

The congregation possesses valuable church property located on the corner of West Sandusky and West Streets. The lecture room, fully equipped with class rooms for Sabbath school work, was erected soon after the congregation was organized. The auditorium, a beautiful structure made of cement blocks, was completed in 1908. The property includes a commodious and modern parsonage, occupied as the pastor's residence. The parsonage stands on the same lot with the church building. The property is located in an attractive part of the city and is free of debt. The congregation embraces the full complement of subsidiary organizations and carries on many activities. Special attention is given to Sabbath School work, and every effort is put forth to maintain a school of the highest efficiency.

The following ministers have served the congregation in the capacity of stated supply: J. P. Sharp, '90-'93; J. F. McKnight, '95-'97; George Whiteside, '97-'01; J. J. Thompson, '02-'04; J. R. Greene, '04-'08; F. E. Dean, in charge of the congregation since July 1, 1908.

The following ruling elders compose the session of the church: J. A. McCall, Robert W. Stewart, W. A. Crawford, B. E. Fox, D. M. McLane.

The congregation worshipped for a time in the old Congregational Church. And a few of the Congregationalists, when their work was abandoned, came into the United Presbyterian Church, and the latter church now enjoys the use of the pipe organ belonging to the Congregationalists. At the present writing the number of communicants on the membership list is 77, and the enrollment of the Sabbath School is 95. Rev. T. E. Dean is serving as the present pastor.

CANNONSBURG UNITED PRESBYTERIAN CHURCH.

This congregation was organized as an Associate Reformed Presbyterian Church in 1850. It became a United Presbyterian Church in 1858, when the union between the Associate and the Associate Reformed Churches took place. During its earlier history this congregation was numerically strong and prosperous; but like many other country churches its membership has been greatly depleted by death and removal. On its roll it has counted many of the staunchest citizens of the community. Many of these worthy families have found homes elsewhere; but the few who still remain are loyal to the church; and it bids fair to be an influence for good for many years to come.

The following ministers have served the congregation as pastors: J. R. Bonner, '50-'59; James Rodgers, '62-'68; J. C. Bingham, '69-'71; Wait Wright, '76-'81; J. E. Kerr, '82-84; R. H. Boyd, '84-'87; J. D. Palmer, 1900-01. F. E. Dean, a pastor in Findlay, has had charge of the congregation since July 1, 1908. The members of session are Archie Hanna, Albert Hanna, Harvey Williamson and William Williamson.

CHAPTER XIV.

ALLEN, AMANDA AND BLANCHARD TOWNSHIPS.

ALLEN TOWNSHIP.

This township, containing 15,360 acres, holds a central position in the northern line of townships and was the last to be organized in the county. It was formed of territory taken from the townships of Cass and Portage, and was named in honor of Ethan Allen of Revolutionary fame. It is bounded north by Wood County, east by Cass Township, south by Findlay, and west by Portage Township. The Bellefontaine and Perrysburg State Road runs directly through the center of the township, north and south, this being the oldest road in the county.

On the 3rd day of June, 1850, the Commissioners of the county, "Ordered that a new township be erected of the following territory, and called Allen Township; said territory of Allen to be composed of Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, 32, of Township 2 (Cass) north, Range 11 east, and Sections 1, 2, 11, 12, 13, 14, 23, 24, 25, 26, 35 and 36 in Township 2 (Portage) north, Range 10, east.

It was also "ordered that there be legal notice posted up in the new township of Allen, for the election of the following named officers for said township, to-wit: three trustees, one clerk, one treasurer and one assessor."

The timber in this township was of the valuable hard wood varieties, such as poplar, walnut, ash, oak, sugar, beech and sugar maple. Poplar was very plentiful in the south part of the township, and was so valuable a timber for building purposes that after the building of frame houses was begun, it soon became exhausted.

The soil in the south part of the township is in part what might be called a sandy clay. In parts, however, it is almost all clay, whilst elsewhere it is entirely sand. On the north side of the township, between the ridge and Wood County line, it is a black loam, composed mostly of vegetable matter. But all parts of the township are easily tilled and are very productive.

The middle branch of the Portage River passes through this township, and is the most considerable stream in this part of the county, and which has water the year around. It passes out of the township near the northwest corner. There are no other runs or creeks in the township, yet the surface of the land is sufficiently undulating to furnish all the necessary outlets for drainage.

John Gardner made the first entry of land, in this township, on the 25th day of August, 1826, it being the west half of the northeast quarter of Section 13. On the first day of June, 1829, Nathan Frakes entered the west half of the southeast quarter of Section 12, afterwards the Samuel Spitler farm. In December, 1828, Major Bright entered the east half of the southwest quarter of Section 36, and a year later, George C. Collins, of Hamilton County, entered the east half of the northeast quarter of Section 36. These entries were followed in 1832 by others, made by Henry Barnel, George Ensminger, Elias Bryan, William Wilkes, Christian Ensperger, and others. In 1826 or 1827 the first settlement was made by Nathan Frakes and one Miller, west of Van Buren, on the Sam. Spitler farm, and by Miller on the farm now owned by J. Kempher. In 1827 came John Trout, Elias S. Bryan and John Burman came, and they were followed by Christian Barnel, who came from Perry county, and located on the Spitler farm, Frakes having purchased and removed to what is now the Infirmary farm. John Barnel, son of Christian, came in the following year, and remained here during his entire life. He, too, moved to the Spitler farm, and his father, with his family, moved to Findlay.

Then came Charles Baker, of Fairfield, the Ensmingers of Wayne, Hugh and John Gilchrist, Jos. Howard and others. All of these families settled around or near the site of the present town of Van Buren.

In 1833 the first election was held in the township, at which time both of the townships of Cass and Portage voted. But eleven votes were cast. The first election held in the present township, was in 1850, in accordance with the order before recited.

The first schoolhouse was built in 1836, on the farm later owned by I. W. Whetstone. It was of the round log, clapboard roof, huge chimney variety. There are now six school houses in the township, all of which have passed through the transition stage from log and frame to the more substantial brick structure.

The first church was built at Van Buren by the Presbyterians, Rev. George Van Emon, pastor. Among the first members were Samuel Huntington, John Leader, some of the Moreheads of Portage Township, and the Campbells, of Wood County. This organization still exists. There are now three church buildings in the township, one Baptist, one Presbyterian, and one United Brethren, all located in the town of Van Buren.

The Baptist Church was organized in 1855, and Henry Roder and wife, Samuel Kagy and E. Smith were some of the first members. Previous to the building of the church, services were held at the house of Henry Rader, and as a branch of the Findlay Church.

The first marriages were those of a Mr. Beeson and a Miss Trout; and Francis Rumor and Miss Ensminger. The first death was that of a child of John Trout.

John Burman built a mill on the creek east of Van Buren, at an early day, which was the first built in the township. But as it was propelled by water, and during a great portion of the year the water was so low in the creek, as not to furnish power, the mill was not of much benefit to the early settlers, who had to patronize the Teatsworth horse-mill at Findlay, or go to Perrysburg, or to Sandusky City for flour or meal.

Every community has its tragedies and a most distressing event of this kind occurred at a very early day, in the settlement of this township. John Gilchrist and his little son, a boy of twelve years of age, and his brother, Hugh

Gilchrist, were out at night hunting raccoons. When about a mile and a half northwest of Van Buren, on the McMurry farm, a 'coon was treed, and it became necessary to cut the tree down in order to get it. Before it fell, John took his son in the direction the tree was to fall, and to a distance that he thought would be out of reach of the falling tree. When it fell, however, it struck another, which in falling killed the boy outright, and broke the thigh of the father. Hugh was unable to move them without help, which he was some time in procuring. He then took his brother to his home, where he died two days after, leaving a wife and five small children. They were very poor, but were assisted by the good neighbors.

The "Wild Cat Thicket," which extended through this township, was in early days so densely covered with an undergrowth, as to be hardly passable, and although game was plenty elsewhere, it could not get through this thicket. The timber or brush was then quite small. Only a few large trees were standing. Mr. Barnd killed forty-five deer the second year that he was in the township, besides large numbers of smaller game, yet he did not consider himself a hunter, as he had his farm to attend to.

The first frame building erected in the township, was the Presbyterian Church, which was built by John Kelley. The first brick building was that of John Trout, on the south of the town of Van Buren. Old Johnny Appleseeds was through this part of the country, and planted a number of apple trees in this township.

The following extract is from a paper read by Mr. George W. Trout, at a meeting of the Pioneer Association of Hancock County, held thirty years ago: "On November 12, 1828, my father, John Trout, with his family, left Somerset, Perry County, Ohio, for the regions of Hancock. He passed through Thornville, Newark, Johnstown, Sunberry, Delaware and Marion, thence into the Wyandotte Reserve, where we remained one night, at the house of a widow Walker, a half-breed Indian, formerly the wife of an Indian. Here we had sight of the first Indians we ever beheld. We took dinner and fed our teams the next day, at a tavern in Upper Sandusky, kept by one Armstrong. Mrs. Armstrong was an Indian. We crossed the Tymochtee Creek near the dwelling of John James. From this place we sent back our four-horse team, and father and my brother Ephraim proceeded to Van Buren, or rather to the settlement near there, as at that time and for many years thereafter, there was no town, to procure teams to take us the balance of the journey. After procuring the necessary teams, on their return, taking the Indian trail, they cut their way back, by way of the Big Springs. We were eleven days, anxiously awaiting their return. We again took up our line of march, and on the following night, stopped with Peter George, in what was then known as the "Swamp Settlement." On leaving Mr. George's, we were told to strike the river as far up as possible on account of high water. This we did, and came to the river at a point called Ashery Ford, but even here the water was so high, that in crossing it, it ran into the wagon box. That night we camped in the woods, having failed to reach any settlement.

"The next day, by dint of hard traveling, by a road we had to make as we went, we, at sunset, arrived at the house of a Mr. Powell, about three miles above Findlay. On the next day, about noon, we reached the old 'Fort,' passing on the way, a schoolhouse, which was a very insignificant log cabin. There were then but sixteen buildings in Findlay, and these seemed to be built in mud and water.

"Though the town was then in its infancy, its people showed, by the generous assistance afforded us in crossing the river, they at least possessed noble hearts. We crossed the river in a 'Pirogue,' and passed the night in a shanty near where Carlin's mill now stands—now the location of the Toledo Bowling Green and Southern Electric Railroad office. We still had seven miles to go. Mother, brother John and I started on foot, and so continued our journey as long as the logs in the way furnished a passage over the water. But presently we reached the end of this natural bridge. Here, luckily for us, a Mr. Foster came to our relief. He took mother on the horse he had brought with him. All that was left for John and I was to wade, and we did wade until we reached Mr. Foster's house. We had by this time become quite cold, for it had snowed the night before.

Having been refreshed by the kindness of Mr. Foster and his family, we continued our journey, urging our cattle through the mud and over the logs, and at last, about the middle of the afternoon, tired out, we arrived at the house of Mr. Miller, on the farm on which Samuel Spitler now resides (now owned by Stephen D. Spitler). In the evening the balance of our party arrived with the horses, but no wagons. The wagons had got stuck in the mud about three miles back, and the horses were unable to extricate them. It required all the next day to secure the wagons and bring them in, for it was sunset on December 15th, when they arrived at the cabin on the hill. These cabins were of the rudest build, and plainest surroundings. On the morning after the first night in our cabin, our first inquiry was, who are our neighbors, and how far are we from any place? We were on the eastern frontier of our immediate neighborhood, Miller, Bryan and Frakes living about one mile to the west of us. Our nearest neighbor on the east was a Mr. Wade, who lived about eighteen miles distant. On the south, Mr. Foster lived at a distance of about six miles. On the west the nearest settlement was at Fort Defiance, about forty-eight miles away. Twelve miles to the north lived Mr. Haskins.

"Soon after our arrival, the Mr. Miller of whom I have spoken, died, and Mr. Frakes moved to his new home on the river, now the Infirmary farm, which left but two men in the settlement."

AMANDA TOWNSHIP.

Amanda Township borders on the east line of the county, south of the center line, and contains 17,380 acres. It is bounded on the north by Marion and Big Lick Townships, on the east by Wyandotte County, on the south by Wyandotte County and Delaware Township, and on the west by Jackson Township. This township was organized in 1828, the first year of our county's existence.

In the year 1830, at the time of the organization of Marion and Liberty Townships, the territory included in Amanda and Findlay Townships was so divided as to form the four townships Amanda, Marion, Findlay and Liberty. In December, 1831, it was ordered by the Commissioners that "The township of Amanda shall hereafter consist of the original Township 1 south, in Range 12, and Sections 34 and 35, in the original surveyed Township 1 north, in the 12th Range. This township at the present time, and ever since the formation of Wyandot County (Sections 34 and 35 having been restored to Township 1 north (Big Lick) by act of the County Commissioners), comprises Sections 1, 12, 13, 24, 25 and 36 in Township 1 south, Range 11 east, and Sections 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32 and 33 in Township 1 south, Range 12 east.

The timber was principally walnut, ash, oak, elm, hickory, beech, sugar. There were a few places in the township that were but sparsely wooded; notably so a tract in the northeast part known as the fallen timber region, and a portion of the southeast known as the swamp.

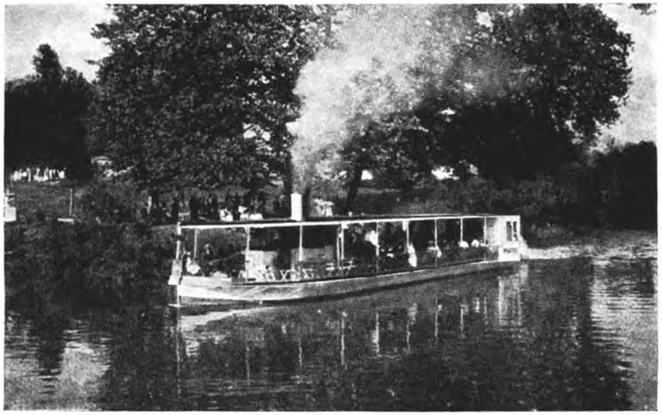
In the eastern part of the township the soil is clay, mixed with sand and gravel and when once properly cultivated is very productive. In the south part is what the people here call the "swamp," a strip of land not many rods wide, but extending almost across the township, from east to west, the soil of which is a deep rich vegetable loam, mixed with sand. This tract at the early settlement of this section, was thought to be almost, if not wholly worthless. But as agricultural science developed the means by which it might be brought into use, it was found not only possible to reclaim it, but that when so reclaimed it was unusually productive. The river bottoms of a sandy, gravelly nature, plentifully mixed with the rich deposits of vegetable matter, made by the overflows of the water, of course are easily tilled, and yield almost abundantly. In the northern part, as we have elsewhere observed, is a tract of about 800 acres known as the "Fallen Timber," the soil of which is a muck, mixed with portions of clay and sand. This tract was originally very wet, and it is owing to this fact, perhaps, that so much of the timber especially the larger, has fallen.

The Blanchard River enters this township near the southwest corner of Section twenty-five, runs east to about the center of the section, and then almost directly north through Sections 24, 13, 12, and into Section 1, when it takes a north-westerly direction, leaving the township near the northwest corner. This river furnishes an abundance of water, as well as drainage for the most part of the township and is of immense value.

Buck Run, a small and unimportant stream, is the only tributary of the Blanchard, and is important only as a source of drainage. The Big Spring on the land of David Smith in the northeast of the township is most valuable on account of the great volume of water discharged as well as the excellent quality of the same. This is undoubtedly the largest spring in the county. Such is the amount of water discharged that an abundance is furnished for the watering of stock in all this part of the township.

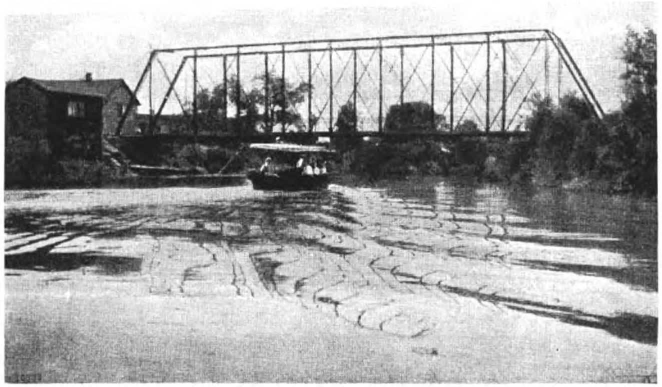
Thomas Thompson made the first entry of land in this township, on the 25th day of February, 1822, being the east half of the northwest quarter of Section 3, and on the 27th day of the same month, the west half of the northeast quarter of the same section was entered by Henry McWhorter.

In October, 1823, John Brundidge entered the northwest quarter of Section 36 and John Smith entered the west half of the southwest quarter of the same section in December of the same year. In the month of March, 1825, Isaac Giffort, of the State of New York, made entry of the east half of the northwest quarter of Section 12. In



STEAMER PASTIME AT PARK LANDING, FINDLAY

RIVERSIDE PARK, FINDLAY



BLANCHARD STREET BRIDGE, FINDLAY

PAVILION, RIVERSIDE PARK, FINDLAY

1826, Ira Baker and John Shoemaker made entries. These were followed in 1827 by John Beard, Peter George, Abraham Cole and others, and in 1828 by Jesse Gilbert, John J. Hendricks, Andrew Beck and others.

In 1824 Thomas Thompson made the first settlement made in this township, near the Big Springs, about one mile from the site of the present town of VanLue,—the water of this spring is now used to supply the city of Findlay with water—and in 1825, John Huff and William Hackney came. Soon after came James Beard, John Shoemaker, Henry George and Thomas Cole, followed by Peter George, James Gibson, John Hewitt and Aquilla Gilbert. Judge Abraham Huff was also a pioneer of this township. The first election held in the township was in 1828. Thomas Thompson was a resident of this township for more than fifty years, and was highly esteemed by his neighbors. He was engaged in farming, an occupation which he followed to within a few years of his death. On his retirement he moved to the village of Van-Lue, where he spent his last years in quiet, and died, regretted by his many friends.

A well known character in the early days was Peter George, who was known as the "Pioneer Land Hunter," he having entertained, and guided through the forests of Hancock County, more land hunters and immigrants than any other man in the county. He served as county commissioner for six years, with integrity and honesty of purpose. William Hackney was one of the first officers of the county, and is mentioned elsewhere.

Aquilla Gilbert, one of the first settlers of Jackson, as well as of this township, taught the first school in this township. Mr. Gilbert was prominently connected with the affairs of the county almost from its first organization, and held office in both township and county. He was one of the commissioners for six years, having been elected in 1837. He served as justice of the peace for five consecutive terms in Jackson Township, and three terms in Amanda Township.

The first schoolhouse, as stated by Aquilla Gilbert, was built in the Messemore neighborhood, and the first school was taught by Mr. Gilbert. Another opinion, that of J. M. VanHorn, is that the first schoolhouse was built near the center of the township, and that the first school kept in the township was in a house on the farm of Uriah Egbert, in about the year 1831, and that one George Smith was teacher. It is not very material which of these gentlemen is correct, for all agree that these two schools were almost, of not quite contemporaneous. There are now eight sub-districts in the township, each of hich has a comfortable schoolhouse, and nearly all are of brick construction.

The first church was built in 1831, in the south part of the township. It was known as the "Swamp Church" and was owned by the Lutheran denomination. Among the first membership, we find the names of Fred Brenner and ife, Adam Alspach and wife, and several members of the Beck family. The first sermon preached in the township was a Rev. Thompson, an Indian Missionary. There are now in this township eight church buildings as follows: one Methodist Episcopal, one Methodist Protestant, two United Brethren (one in Vanlue and one at "the swamp" properly known as the Union Church), one Baptist, one German Reformed, one Lutheran and one Disciples.

There have been three Post Offices in this township, but two of them were long since discontinued. The first established was the Blanchard Bridge at the house of Aquilla Gilbert, on the Blanchard River. Mr. Gilbert was the first and only postmaster.

The office was in existence for many years and was a great accommodation to the citizens. But villages sprung up in the vicinty and travel took another route and the office was discontinued. Shortly after the establishment of "Blanchard Bridge" another office was established near the Richard Hall farm and called "Ashery." Joseph Twining was the first and only Postmaster here. This office was long since discontinued for the reason that the necessity for its existence has passed away. The third office was established at Vanlue of which we will speak in the proper place.

Amanda is one of the most populous townships in the county, and it is fast becoming one of the wealthiest. Each year sees the better improvements of the older farms, and the reclaiming of new lands; the erection of a better class of farm buildings and the introduction of the latest improved farming implements. The early settlers came principally from the eastern counties in the State, and their descendants are an active, energetic and progressive people.

BLANCHARD TOWNSHIP.

Blanchard Township is on the west border of the county, bounded north by Pleasant Township, east by Liberty, south by Union, and west by the Hardin County line. It derives its name from the river, which passes through it from east to west, dividing it into almost equal parts. The township contains 23,040 acres.

The soil in this township varies with the locality. Along the river it is a rich sandy loam, mixed with vegetable deposits, made by the overflow of the river. On the south ridge it is a fertile, sandy soil and between the ridge and the river bottoms the land is flat and rather wet, but covered by a rich deep soil of vegetable loam, mixed in places with sand or clay. On the north side of the river, after getting back from the bottom lands the soil is almost invariably clay, good wheat and grazing lands, whilst for the production of corn the bottom lands are not excelled anywhere.

Oak, ash, hickory, sugar, beech, walnut, and poplar, are the principal timbers. Of the latter kind, there were immense amounts, and of the finest quality, but such has been the demand for it, that it has almost entirely disappeared.

This township is well watered by the Blanchard River and Ottowa Creek. The river passes through the township and furnishes water the whole year around and also the best of drainage. It is subject to occasional overflows, but does no material damage.

Ottowa Creek rises in Section thirty-six, in Union Township, runs in a northerly direction, enters Blanchard Township in Section thirty-six, runs north, thence west, thence in a north-easterly direction, and empties into the Blanchard River in Section fourteen. Its distance in the township is about four miles. It is quite a considerable stream, and there have been quite a number of saw-mills along its course, at different times. It furnished the means of drainage for almost the entire south part of the township.

The act of the commissioners in organizing this township, was passed in 1833, in the following words: "That original surveyed Township No. 1 north, Range 9 east, shall be known and organized by the name of Blanchard." In March, 1834, the commissioners "Ordered that Township 2 north, Range 9 (Pleasant Township), be attached to Blanchard Township," but a year later this township was detached from Blanchard and organized into a separate township.

The first entries of land made in this township were the north half of the northwest quarter of Section 13, by David Stinson, and the northeast quarter of the northeast quarter of Section 13, by John Veal, both entries being made on the twelfth day of August, 1822. On the 19th day of the same month and year, W. A. Johnson entered the southeast quarter of the northeast quarter of Section 15. In September, 1825, John Hunter took up the south half of southwest quarter of Section 15, and James McClish entered the east half of northeast quarter of Section 20. In 1827, Orlando Moffit entered the west part of southeast fractional quarter of Section 27, and John Dukes the east half of the northwest quarter of Section 15, and Henry Epley the east part of the southeast quarter of Section 18. These entries were followed by others, and a settlement of the township followed close on the entries.

The year 1826 saw the first settlement in this township, when John Hunter and John Chandler, both of Fairfield County, located on the south side of the river, on the George Shaw, and afterward the Alfred Davis farm. The majority of the settlers in this part of the county were from the interior of the state, with now and then a family from Pennsylvania and New York.

These first two families were not long without neighbors, for in 1828, Richard, John and Lewis Dukes, of Franklin County, and Thomas Groves, of Pickaway County, settled on the opposite side of the river, and opened up extensive farms, and erected comfortable buildings. Of these four pioneers all lived to the end of their lives on their farms excepting Richard Dukes, who in his latter years moved to Findlay and spent the balance of his life enjoying the fruits of his early labor. His last years were peaceful and quiet, spent in the enjoyment of the company of his friends, his home and its comforts, and he left a goodly inheritance to his children. Three of his sons—Lewis, Eli and W. P.—are now residing in Findlay as retired farmers.

Lewis Dukes, Sr., came to this township in 1826, and when only about nineteen years of age, and hired out as a farm hand. In a few years, by his industry and frugality, he was able, at the low wages then paid, to accumulate enough money to enter a tract of eighty acres of land. This he improved, and was enabled as the country improved, to add many acres of valuable land to it, until he became one of the wealthiest men in the township. Mr. Dukes was twice married, but was never blessed with children. He united with the Methodist Church in early life, and remained a consistent member until his death, ever living up to his profession.

John Dukes remained in this township until he became well advanced in years, and had witnessed the many changes which had occurred, when he disposed of his property and removed to Wood County, where after a residence of several years, he too was gathered to his fathers.

The Dukes brothers were early and consistent members of the Methodist Church and friends to and workers in the Sabbath Schools. The first church building in the county was put up in this immediate neighborhood and they contributed largely not only to its erection, but also to sustaining the ministers sent among them. This old log church was superseded by a frame building erected a little further west, which was used by the same society until about 1879, when it in its turn made room for a more comfortable and pretentious brick building. There are now two Methodist Episcopal, two United Brethren, and one Evangelical Church in the township, all good substantial buildings.

Shortly after the settlement made on the north side of the river by the Dukes and others, the Powells, Foglesong, John L. and Richard Carson, Engle, Baldwin, Fishel, Hughes, the Downings, Knepper, and some other families settled in and near the present town of Benton. Solomon Foglesong, and his brother-in-law Knepper, came there perhaps as early as 1830 and settled on the banks of the "Tawa," as it is generally called. Foglesong, almost the last survivor of the first residents, was living on the old homestead in 1881, but the weight of years was heavy upon him and he passed away not long after.

Rev. John Powell devoted his life to the ministry of the United Brethren Church and who not only acquired a good farm by his industry and economy, but within a few years found a reputation as the founder of the Powell Association, and the successful manager of two re-unions of the family, as well as the author of a memorial history of the Powell Family. He lived to enjoy the quiet of his farm in the southern part of the township.

Jacob Engle, the kind, generous, large-hearted "Dutchman," as he was called, cleared up and occupied a splendid farm adjoining the present site of Benton, where he lived for years amongst his many friends until about 1860, when he was called away to meet his reward. Honest, generous to a fault, he was a good neighbor, and a social, genial companion. He left a wife and a large family of children, who have since all emigrated to the West, the widow and most of the children going to Iowa.

David M. Baldwin was one of the earliest settlers of the southern part of the township, having come from Fairfield County, and settled on lands adjoining the town of Benton Ridge. All was a wilderness when he came, and he lived long enough to see one of the finest neighborhoods in the county. Mr. Baldwin was a genial, whole-souled man, ever ready to accommodate to the extent of his ability, and equally ready to resent an insult. For years he kept a tavern, where the weary traveler always found a comfortable bed and a well laden table. His descendants are still living in the vicinity of his old home.

The brothers, Thomas, William and John Moffitt, commenced their residence here about the time the Dukes came. Thomas, after making for himself a home and its comforts, was attacked with the "Western Fever," sold his farm and emigrated to Iowa, or the "Black Hawk Country," as it was then called, where he passed the remainder of his life. John and William Moffitt and McClish remained to spend their lives in Blanchard Township. They were among its most substantial citizens.

Michael Fishell, one of the early residents, sold his farm west of Benton about 1887 and moved to McComb where he spent the balance of his days.

Alfred Davis, another frontiersman, and at one time one of the solid men of the county, owned and occupied a magnificent tract of land on both sides of the river, but unfortunately met with reverses in the latter part of his life; but even in his misfortunes he retained the high regard of his neighbors. He was a man of undoubted integrity of character.

George Shaw, one of the early commissioners of the county, owned a splendid farm here, on which he spent the greater part of his life, and here he died and was buried.

At an early day came also Jeremiah Cocle, David Millham, Solomon Foglesong (or, as in the original, Voglegesong), and the Epleys. These early settlers were all farmers, and no richer agricultural lands could be found in the State than those which they took up and their descendants occupy. These pioneers were hardy, temperate, frugal, energetic and industrious, and well deserve to be placed on the roll of honor as such.

The first marriage was that of John Dukes and Hannah Houchings, the Rev. Thomas Thompson officiating. Two little children of George Shaw were the first in the township to die.

Owen Hughes was one of those honest, upright, cheerful men that are the strength and life of a new settlement. He lived to a good old age and died as he had long lived, a consistent member of the church and a Christian man. He was twice married, but both his wives died before he did.

Dick Carson was one of the champion fighters of the county. Not that he was quarrelsome or chronically pugnacious, but he was a powerful courageous man, of a somewhat sensitive nature, and while not ill-tempered, especially when sober, he was quick to resent an indignity, or an imputation of his courage or veracity. He was just such a man as every township or county wanted to defend its honor, as it was then the fashion, at a general training, or a county horse race. Dick was just the man for that, as many an unlucky braggart found to his utter discomfiture. He was a good neighbor, a firm friend, and, under ordinary circumstances, a peaceable citizen. His brother John L. Carson was at one time surveyor of the county. The two Carsons and their families finally emigrated farther west.

The Downings were of the first settlers, and were a hardy, industrious family, and all became quite well off in course of time. George, David, and William went to California in 1849, but after a few years' experience there they returned to Blanchard Township and applied themselves to agricultural pursuits, and by industry and economy made great additions to their western earnings. In after years William moved to Kansas, where he had the honor of representing his county in the State Legislature. He was followed to his new home by his father, "old Johnny Downing" as he was familiarly called, and his brother Isaac and family. The old gentleman and Isaac have died long ago. George resided in this township until about 1871, when he went to Iowa, where he lived many years.

David Downing was one of the wealthiest and most respected citizens of the township. He was a model farmer with one of the finest dwelling houses, not only in the township but in the county, commodious and convenient outbuildings. His pecuniary circumstances enabled him to devote much of his time to the breeding and introduction of fine cattle in the county. He had some of the best herds in this part of the State. He dealt largely in stock cattle, being quite an extensive feeder. He was a member of the board of managers of the Hancock County Agricultural Society for a number of years and devoted much time in making the Society one of the best in the State. And his efforts and those of his associates were not unsuccessful. He had sons and daughters, all married and some, if not all, I believe, reside in this or adjoining townships.

This locality on account of the abundance of fish and game, was one of the resorts of the Indians on their hunting expeditions. And indeed hunting and fishing were not only among the amusements of the whites, but they were occupations necessary to the support of themselves and families. The fish-net and the rifle was a part of the furniture of every well regulated log cabin, and by their skillful use the tables of the pioneer were bountifully spread.

In 1848 a post office was established in this township called Oak Ridge. It was first located at the house of William Downing on the Findlay Defiance State road, north side of the river. Mr. Downing was the first postmaster. It was an office of no importance, only as it gave the community in which it was located, mail facilities. It has since been discontinued. Mr. Downing was succeeded by the following persons as postmaster: Robert Marshall, Mr. Morris, Mrs. Wm. Downing, Rezin Cook, David Downing, Eli Dukes and L. C. Groves.

The first school in Blanchard Township was held in a log cabin affair, which stood near what was later the site of the Thomas Groves residence, and was built in 1830. It was taught by John W. Wickham. There are now ten school buildings in the township and the enumeration of youth is three hundred and eighty-four.

CHAPTER XV.

BIG LICK, CASS, AND DELAWARE TOWNSHIPS.

BIG LICK TOWNSHIP.

The county commissioners, at their session of March 7, 1831, after defining the boundaries and extent of Amanda Township "Ordered that the original survey of Township 1 north, in range 12 east, except Sections 34 and 35 shall hereafter be known and organized by the name of Big Lick. On June 3, 1833, Robert L. Strother and John Rose, commissioners, being present, the following order was passed: "Ordered that Big Lick Township shall include the whole of the original surveyed Township No. 1 north, in Range 12." Since the passage of that order, the township has been known as an original township of thirty-six sections. It contains 23,040 acres.

This township is on the east line of the county and is bounded on the north by Washington Township, on the east by Seneca County, on the south by Wyandotte County and Amanda Township and on the west by Marion Township.

The general surface of the land is level, although some parts are undulating. The prevailing soil is clay loam. In the southwestern part of the township is a sand ridge which is underlaid with limestone. In that locality is also a marsh or prairie, some 1,500 acres in extent, which is entirely a vegetable soil, and largely unreclaimed, except for grazing purposes. It will no doubt all be brought under final cultivation by the help of drainage. That so much of it has been reclaimed is largely due to the enterprise and well directed exertions of Judge Corey, of Findlay, who at one time owned most of the entire tract.

The timber, which has long since been cut down, embraced red, white and burr oak, blue, black and white ash, beech, elm, hard and soft maple, sycamore, black and white walnut, hickory, basswood and buckeye. The township was traversed by a ridge of white oak of such excellence, that shipments of logs were extensively made to foreign countries.

No streams of water traverse the township of sufficient size to furnish water-power. The only stream that maintains a current during the entire year is the outlet to the marsh or prairie. This sluggish stream takes its size in Seneca County, runs in a westerly direction and empties into the Blanchard River near Mr. Allen Wiseley's in Marion Township. There are a number of smaller streams, which, however, are only water courses in wet weather.

In September, 1821, Henry McWhorter made entry of the west half of the southeast quarter of Section thirty-four. This was the first entry of land in the township. In May, 1825, the east half of the southeast quarter of Section 27 was entered by John G. Alspach, and September 5th of the same year Eliza Huff entered the east half of the northwest quarter of Section thirty-four. In December, 1828, John Shoemaker made entry of the east half of the southeast quarter of Section 17. These entries were followed in 1829 by those of John Huff, of the west half of the southeast quarter of Section 17 and of the west half of the northeast quarter of Section 21, by John Long. In 1830 Henry Hinebaugh, of Fairfield County, entered the northeast quarter of Section 1, and in the same year Uriah Egbert took up the west half of the northwest quarter of Section 19, and about the same time an entry of the west half of the northwest quarter was made by Philip Essex. William Hackett, of Stark County, William Roller, of Richland, Elijah Brayton, of Crawford, Mary Graham, of Madison, John Graham, William Wisely and others made entries of land, and became residents of the township.

The first actual settler in Big Lick Township was Samuel Sargent, from Ross County, who made an improvement on the limestone ridge, in the southeastern part of the township some time in 1826. In the following year John Long located near the center. In February, 1829, John Shoemaker settled about three-fourths of a mile west from Mr. Long's. Mr. Shoemaker could recount the many hardships and incidents of frontier life. Long and Shoemaker came from Fairfield County, this state.

In 1831 was held the first township election, the electors present being John Shoemaker, Robert Long, Levi Poulson and Cornelius Poulson. Whilst these men were holding an election and organizing the township the good Mrs. Long, at whose house they met, prepared them a dinner of the best in her larder. Amongst the early settlers here were the Thomases, the Moores, the Rollers, the Grahams and the Poulsons.

Numerous sulphur springs on the farm of Robert Long, near the center of the township, comprise what used to be a famous deer lick called "Big Lick," from which the township derives its name. Large numbers of deer were killed here by the owner of this land and others.

Mr. Long, on one occasion, had secured his seat in a tree convenient to the lick, when a colored man, who had been assisting in driving some cattle from some point farther west, and was on his return home, being overtaken by night, concluded to camp near the springs. Mr. Long supposing him to be a rival hunter watching for deer concluded to frighten him away, whereupon he made such an unearthly noise that the poor fellow took to his heels and never stopped until he brought up in the Blanchard River, near Allen Wiseley's. He had so overheated himself as to cause his death soon afterwards—a tragic ending of the joke that Mr. Long had not anticipated.

Gangs of Indian hunters and trappers made the neighborhood their rendezvous and greatly annoyed the early settlers. Mr. Shoemaker, who was more progressive than his neighbors, had secured a grindstone, of which the Indians made such extensive use to sharpen their dull tomahawks and knives, that it was soon entirely worn out. They also had a way of trading venison for pork and potatoes with Mrs. John Moore, in which she invariably came out second best. Knowing that she was afraid of them, they would make their visits in the absence of her husband, when she, in order to get rid of them, would send them to the patch to help themselves, which they did so liberally that the whole crop had soon disappeared. Vermin were also destructive to the corn. The settlers could only protect themselves by the use of the rifle, and if one chanced to be a poor shot he employed some one by the day who was an expert with the gun. At night too, the corn needed watching to save it from the raccoons. Mr. Moore at that time owned 160 acres of land and was perhaps as well off as any of his neighbors. He was, however, compelled to manufacture his own furniture. His first child was rocked in a sugar trough, made by "Big River," a Wyandot chief, and which had been used before the arrival of Mr. Moore in the country as a sap trough by the Indians.

Mr. Moore's first bedstead was made by himself of iron-wood poles. The cords were of bass-wood bark, well interlaced together. No straw was to be had with which to fill the ticks and Mr. Moore thereupon gathered forest leaves sufficient to make a mattress. Mr. Moore was elected first supervisor of roads in the township and had for a district the north half of the township some eighteen square miles. He superintended the opening of the New Haven Road from the east township line westward to near the center of the township.

As all the inclosed land had to be cultivated in order to produce food for man and beast, stock of every description was allowed to run at large in the forest. The damage done to crops by stock running at large made trouble amongst the people, and a board of fence viewers became necessary. This board were to determine, when called upon, whether or not the enclosure was a sufficient or legal fence. Accordingly William Roller, who was noted for his avoirdupoise, William Moore, who was noted for his diminutiveness, and Richard Bayless, noted for his activity, were chosen as the Board of Fence Viewers. It was then agreed that any fence which would bear Mr. Roller and through which Mr. Moore could not creep nor Mr. Bayless jump over should be declared a lawful fence.

The first schoolhouse in the township was built in 1836, exclusively by voluntary labor. It was located in the forest a full half mile from any public highway, upon the farm now or lately owned by the heirs of James Graham. There were but two sub-districts in the township at the time. Sometime subsequent to the above date there was another schoolhouse built, about two miles west of the first on the lands owned by the heirs of Moses McAnnelly. A fair interest was taken in the cause of education by the citizens of this township; the schools have been kept up to an efficient standard and are well attended by the youth of the township.

The first church erected in the township was a hewed log structure thirty-six feet square and located on the present site of Enon Valley Church on the Findlay and Tiffin road. It was built in 1844 by the citizens in the neighborhood, mainly however of the combined efforts of the Presbyterian, Covenanters and Seceders. The first site selected for the building was upon Robert Leonard's farm, some two miles southeast from the one subsequently built upon. Rev. R. H. Hooyday, of Findlay, Superintended the building of the church. There are now eight churches in this township. Two owned by the Evangelical denomination, two by the United Brethren, two Methodist Episcopal, one Presbyterian and one Christian Union. Amongst the first church members were Henry Thomas and wife, James Thomas and wife and Andrew Poulson.

Big Lick Township has been so developed in its resources, as to be one of the richest in the county. Wheat, corn, oats and grass are the principal crops and also produced in large quantities. The Findlay and Carey Branch of the Cleveland, Sandusky and Cincinnati Railroad runs through the township for a short distance.

John Moore, commonly known among his near friends as "Farmer John" (P. O. Findlay), was born near Lancaster, Pa., October 16, 1808, son of Hugh and Susan (Buckwalter) Moore, the former a native of Tyrone County, Ireland, and the latter of Pennsylvania. Hugh Moore came to America about the year 1800 and settled in Pennsylvania. He had these children, John, William, Nancy, Amanda, George, Joseph, Samuel, Elizabeth, and Sarah.

John Moore came to Ohio with his parents in 1828 and settled in Richland, now Ashland County. He was married in 1833 to Agness W. Roller, daughter of Judge William Roller, a descendant of Captain Weston, an old English navigator and explorer. To Mr. and Mrs. Moore were born eleven children, of whom four are now living, Nancy, Bruce, Lucinda, and Amanda. The deceased are Susannah, Mary, Ross W., William, Dorr, Duff, and Emma.

Mr. Moore came to this county in 1833 with his wife's father, who entered eight quarter-sections of land in Big Lick Township, Mr. Moore getting the northwest quarter of Section 15 as his part, and building his log cabin near its center. This farm is now owned by his eldest daughter, Mrs. A. J. Moore.

Mr. Moore was among the first settlers in this township and came here with his young wife, when all was new, and when energy, industry and good health were the requisites to success, these qualities were all combined in Mr. Moore and his brave wife. They soon opened up a farm, and his house was the stopping place for the stranger emigrant, and at his table was ever found a generous hospitality. Mr. Moore endured all the hardships of frontier life and in his old age was surrounded by his children and grandchildren, in the midst of plenty, the fruits of his toil. He enjoyed life peacefully and quietly, tenderly caring for his good wife, who was an invalid during the latter part of her life. He was one of the largest land owners, as well as one of the wealthiest men in the township. He always followed the independent life of a farmer and was a staunch friend of our public schools and was a public spirited citizen during his whole life. In politics he was a Democrat and voted for Andrew Jackson. Mr. Moore died at his home December 4, 1890, his wife having preceded him to the grave August 9, 1888. Their remains rest side by side in the Bright Cemetery near Mt. Zion Church in Marion Township, this county.

Moses M'Annelly was one of the prominent men of the county, as well as of this township, coming here at an early day and being a man of more than ordinary intelligence, he took the lead in the new settlements. He represented this county in both branches of the Ohio Legislature, and was regarded as an honest, upright man. He, too, was an agriculturist, and made for himself and family a pleasant and valuable home. He has been dead a number of years.

John Shoemaker came to this township from Fairfield County in February, 1829, having the year previous entered lands in Section 17. There were but a very few families in the township at that time, among whom were Samuel Sargeant; on the limestone ridge, and John Long, in the immediate neighborhood of Mr. Sargeant's settlement. Mr. Shoemaker was present and assisted at the organization of 'the township in 1831. The cultivation of the soil was always his occupation. Honest, industrious and hospitable, he always commanded the respect of the community. His sterling good sense always made his advice valuable. He reaped the fruits of his long years of toil and privation, happy in the consciousness of the unvaried rectitude of his life. He has been dead several years.

William Roller, one of the associate judges of the Common Pleas Court of the county, was also a resident of this township. As a judge, his good common sense and honesty of action gave him his very flattering reputation. Honest in his convictions, sympathetic in his feelings, he could hardly err in his decisions, as he was a man of average intelligence and fair common school education. He never abandoned the occupation of a farmer, but succeeded in amassing a competency and leaving a considerable inheritance to his children. He was respected by his neighbors and was always a friend of those in need. Unostentatious in his private life, and courteous in public, he could not but have hosts of friends.

CASS TOWNSHIP.

On the 1st day of March, 1833, the commissioners "Ordered that the original surveyed Township Number 2, in Range 11 east, be set off into a separate township, politic and corporate, and to be called Cass." Ordered that an order be issued to the voters of Cass, to meet on the first Monday of April and elect township officers.

At the formation of Allen Township in 1850, Sections 5, 6, 7, 8, 17, 18, 20, 29, 30, 31, and 32 of this township were taken to assist in the forming of that township. Hence there are but twenty-four sections in this township at present.

Cass Township was named in honor of Gen. Lewis Cass, of Michigan, and is located on the north border of the county. Bounded on the north by Wood County, on the east by Washington Township, on the south by Marion and on the west by Allen Township. The township contains 15,360 acres.

The timber of Cass Township was abundant and comprised oak, ash, hickory, sugar, beech, elm, walnut and poplar, with perhaps a few other varieties. The soil on the ridge in the northern part of the township is sandy and gravelly. Between the ridge and the Wood County line, it is a loam of vegetable formation, whilst south of the ridge there is a mixture of clay with other soil.

The Portage River has its source in this part of Hancock County and is the only stream of water in this township. Good drinking water, however, is obtained by sinking wells to a no very great depth.

David P. Day, of Wayne County, O., made the first entry of land in this township on March 10, 1832, at which time he took up the northeast quarter of Section 11. Two days afterwards John Franks entered the southwest quarter of Section 1, and the north half of Section 10. Mr. Franks was also from Wayne County. May 3, 1832, Elam Day entered the east half of the northwest quarter of Section 12 and on the 31st day of the same month, Eleazer C. Fairchild, of Trunbull County, entered the southwest quarter of the southeast quarter of Section 2, and the west half of the northwest quarter of Section 12. In the same year, entries were made by Andrew W. Page, of Green County, D. Shippy, of Seneca, C. W. Colebaugh, Alphens Eldridge, James Wood, Samuel McClellan, of Wayne, William Eckles, of Holmes, James Beeson, of Fayette.

The first schoolhouse was built in 1835 and there are now six schoolhouses in the township and the enumeration of youth of school age in 1880 was 278.

The first church was built in 1843 by the Methodist Episcopal denomination, and was known as the Vickers Church on the ridge. There are now but two church buildings in the township and they both belong to the Methodist Episcopal denomination.

The first settlements were made in 1833 on Sections 1, 2 and 3 by E. C. Fairchild, Daniel Fairchild, David P. and Elam Day, James Vickers, John Franks, Hames Brown, Samuel Harry, and on Section 12 by Charles Eckles, John Welch and George Elliot. On Section 11 by John Hardy, Hiram Hulbert and James Woods. The early settlers here were mostly from the eastern part of this state.

In 1837 a post office was established in this township, which was discontinued in 1867. Daniel Fairchild and James Vickers were the only postmasters.

There is much very valuable land in this part of the county, and the farms and farm buildings, for style and comfort, will compare favorably with that of any other township in the county, as will also the type of citizenship. The Lake Erie and Western Railroad runs across the southeast corner of the township and the New York, Chicago and St. Louis road passes through the township from east to west.

John Burman was born in Luzerne County, Pa., February 18, 1783, and removed to Fairchild County, Ohio, where he was married to Catherine Fisher. He was a gunsmith and worked at that trade until he came to this county in 1828, after which time he was a farmer. He, his father, and two brothers were in the service of the United States in the War of 1812. On coming to this county with his family, he took up his residence in a log cabin on the land which he subsequently occupied up to the time of his death.

Mr. Burman was of medium height, and weighed about 175; of strong constitution and robust health he was well calculated to do battle with the hardships of pioneer life. In religious belief, he was a Lutheran, and was a member of that church many years. He built the first mill in the township. During the first year of his residence here, his was the only family residing in the township. Two of his sons were in the army during the rebellion. Mr. Burman died in 1863 and his aged wife survived him about five years.

Ezra Karn was one of a family of eight boys and four girls, all of whom attained full age except one, and was born in Washington County, Md., September 16, 1815. The family removed to Ohio in 1817, settling in Holmes County. In 1836 Mr. Karn came to Hancock County with his family and settled in this township on the farm later owned by P. C. Redfern. Again the family became frontiersmen, the country being new, and but sparsely settled, and without roads or markets. Here the Karns had as neighbors, John Hardy, Hiram Hulbert, Daniel Fairchild, John Franks, John Eckles, and James Vickers.

In 1839 Mr. Karn married Miss Elizabeth Albertson, and commenced at once to make for himself a home. He cleared up two farms and by his industry and perseverance succeeded in surrounding himself and family with the comforts of civilization. Mr. Karn had a family of eight children. His wife died in May, 1880, after a long and useful life. Mr. Karn had the confidence of his neighbors and acquaintances for his sterling honesty and good common sense. He was a member of the Lutheran Church and his life was one consistent with his profession. He was one of the very first members and for many years an officer of the Hancock County Agricultural society, organized in 1852, and always lent his influence and aid to its building up and its success is largely due to his continual labors in its behalf. He was vice president of the society for several years.

James Vickers was born in England and came to this country in about 1825 and settled in Wayne County, Ohio. In 1833 he made his way to this county and commenced his labors on the farm later owned by his son, James A. No man in the township was more generally respected than was Mr. Vickers. Conscientious, honest, temperate, and hospitable, kind to all. a friend to the poor and always ready to render assistance to the weary emigrant. His house was the home of the Methodist itinerant and here services were held until a suitable building could be erected upon his land. To the building of this house and the sustaining of the minister of the church he was a liberal contributor. Mr. Vickers was a farmer and by the aid of his good wife and his family, which was a large one, he always had an abundance. He died in 1867, lamented by the entire community. His wife survived him until 1881.

John Eckles was born in Westmoreland County, Penn., on the 25th day of April, 1795, and resided in that state until 1836. In 1819 Mr. Eckles married Esther Booth, with whom he lived up to the time of her decease in 1862. His ancestors were from Ireland. During his whole active life he followed the occupation of a farmer. He is a man of strong will and of very decided opinions, and was not easily swerved from his purposes. In 1836 with his wife and four sons he emigrated to this township. He purchased 220 acres of land on the ridge, between Fostoria and Van Buren, principally of John Franks, Sr., which he developed into one of the very best farms on the ridge. The country was new, no markets, no roads, no neighbors scarcely, and the family endured all the hardships incident to new settlements. Mr. Eckles united with the Presbyterian Church in early life, and was one of the first members of that church at Van Buren.

DELAWARE TOWNSHIP.

The territory now included in the township of Delaware was organized in the year 1828, and was at first named Welfare. On June 1, 1829, agreeable to the petition of sundry citizens of the township, the name of Welfare was changed to that of Delaware. The township no doubt owes its present name to the fact that the Delaware tribe of Indians made this part of the county a favorite resort. This township now includes Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 36, in Township 2 south, Range 11 east and Sections 6, 7, 18, 19, 30 and 31, in Township 2 south, Range 12 east. It is located in the southeast corner of the county and bounded on the north by Amanda and Jackson Townships, on the east by Wyandotte County, on the south by Hardin County, on the west by Madison Township. It contains thirty sections of land, or 19,200 acres.

The soil of Delaware Township is generally a black sandy loam, intermixed with clay in some parts. The Blanchard River traverses the township from south to north and with its fertile bottom lands and numerous creek bottoms, makes it one of the best agricultural districts in the county. Many of the most beautiful farms in the county are to be found here. The land—as in all parts of the county—was heavily wooded, and the improvements we see here are the result of most arduous toil.

The timber that was found here was of the usual kinds, indigenous to the country, such as sugar, beech, elm (white and black), ash, the different varieties of the oak, walnut, hickory, hackberry, buckeye, etc.

The township is well watered by the Blanchard River, which crosses it, and by the creeks and runs tributary to it. The most considerable creek is in the eastern part of the township and called Potato Creek. Good drinking water can be had in all portions of the township by sinking wells from ten to thirty feet.

The lands in this township were mostly purchased by emigrants from the southeastern counties of Ohio. A few, however, were from Pennsylvania and Virginia. This was a full township of thirty-six sections until the formation of Wyandotte County in 1845, when one tier of sections on the east side were taken to help form that county.

Asa M. Lake made the first entry of lands in this township Dec. 12, 1822. The tract entered was the west half of the northwest quarter of Section 1. This tract was on the east side of the Blanchard River and is now occupied in part by the village of Mt. Blanchard. In 1823 entries were made in the following order as to dates: Michael Buck, west half of the northeast quarter of Section 2; Curtis Berry, east half of northeast quarter of Section 2; John Brundage, the southwest quarter of Section 1; W. J. Greer, east half of northwest quarter of Section 1; John Rose, east half of southwest quarter of Section 14; William Davis east half of northwest quarter of Section 14. Then followed entries by David Augustus, Marquis Lafayette Plumb, Levi Edgington and others, in 1826, and by Josiah Elder, Godfrey Wolford and others in 1827.

Asa M. Lake built a log cabin on a parcel of ground afterwards owned by Michael Treece and in the limits of the village of Mt. Blanchard. The parcel of land had been used by the Indians as a burying ground and many skeletons and relics have been found there.

Amongst the first settlers of this township, in addition to Asa M. Lake, were Josiah Elder, the Hamlins, the Wolfords and the Greers. The settlement here was perhaps the very earliest in the county next to that at Findlay.

Don Alonzo Hamlin was the first sheriff of the county and was also county assessor. Godfrey Wolford was coroner of the county and was also county commissioner, and Asa M. Lake was one of the first justices of the peace in the county.

Mr. Lake after coming to this county resided here up to the time of his death. He was a typical pioneer—hardy, industrious and honest—and succeeded in building up for himself and his children a home in one of the richest sections of our county, living long enough to see a thriving village built up on the very lands he had redeemed from the wilderness, and peopled with an intelligent and energetic population, supplied with schools and churches and other appliances of civilization. The redman who had been his early companions had long since removed westward, and herds of domestic animals taken the place of the wild. Josiah Elder, whose parents came to this part of the county almost simultaneously with the Lakes, after spending an honest, active lifetime, almost, in the township, died many years ago on the old homestead.

Mrs. Henry Helms, a sister of Mr. Elder, related to D. B. Beardsley some years ago the incidents connected with her wedding day, in that long ago. She was first married to William J. Greer of this township. She relates that her intended husband and herself travelled from Delaware Township to Findlay on horse-back (both on one horse) through the almost trackless wilderness, where they obtained a license, and then in the same manner went to the residence of Joshua Hedges, a justice of the peace three miles west of Findlay where they were married, and returned to their homes. The trip occupied three days.

The first schoolhouse was built in 1830 near the center of the township, on the farm owned by J. A. Rose. The first school was taught by John Wolford. The school population was not large at that time, and were easily accommodated in the log schoolhouse. The enumeration of school age in this township is 355, outside the town of Mt. Blanchard. There are now eight schoolhouses in the township, one graded and seven common or ungraded.

The first church in Delaware Township was built in 1838, by the Methodist Episcopal denomination, in the town of Mt. Blanchard. But it must not be supposed that the people were without religious services up to that time. Services had been held in schoolhouses and private houses. There are now seven churches in the township, three Methodist Protestant, two Methodist Episcopal, one Baptist and one Presbyterian.

Godfrey Wolford built a flouring mill on the Blanchard River in 1830, near the center of the township. The mill was known as Fahl's Mills. And Felix Miller built a sawmill—the first in the township—on the Blanchard River, near the south line of the township.

The only stillhouse ever in the township was built in 1833 by Abner Bell. It was run but a short time and was then sold to Samuel Thornton and removed to Jackson Township, where it was operated for several years.

The first white child born in this township was John B. Elder and it is believed to have been the first white child born in the county. Marion Greer was the first white female born in the township. Nancy Williams, wife of Nathan Williams, was the first white person who died in this township.

The first election for township officers was held in 1832. R. W. Hamlin, Harvey Smith, and John Rose, were elected trustees; Godfrey Wolford, clerk, and D. O. Hamlin, treasurer.

The first couple married were Asa M. Lake and Charlotte M. Greer, and the second couple, William J. Greer and Rosanna Elder. Both couples were married by Joshua Hedges, J. P., of Findlay.

In 1828 or 1829, as John H. Greer, M. S. Hamlin, J. Greer and D. O. Hamlin were out at play, they came to where a tree had been blown out by the roots and in falling had left bare the skeleton of an Indian. Here they found a large amount of jewelry, consisting of finger rings, ear and nose rings, wristlets, breast plate, necklace, and quite a large nugget, which they supposed to be copper, all engraved with some French characters. Supposing the rings to be nothing but tin and of no particular value, they divided them equally among themselves as nearly as they could. There was a trading post established in what is now Wyandotte County, the agent of which, hearing of this find, sent word that if they would bring them to him, he would pay them all they were worth. M. S. Hamlin sent his portion of the property, for which he received seven dollars in money. The nugget laid around for a long time, pieces being frequently knocked off and it was finally lost. This was afterwards supposed by some to have been gold.

In 1830 John Greer and M. S. Hamlin, two lads, concluded that they would take a hunt and with their guns and ammunition, on a beautiful morning, they started on their way. After spending some time in the sport and securing what game they wanted, they started on their way home, but after travelling some time, and not reaching home, it became evident that they had lost their way. After a few moments of consultation, they agreed on the direction they would take, when, traveling until late in the afternoon, they came to an opening or clearing, when they found to their great surprise and disappointment, that they had arrived at Upper Sandusky. They then struck off on the old Indian trail. To reach home that night they knew was impossible, but they determined to go as far as they could. Just as the sun was setting, they came to an Indian wigwam. The old Indian and his squaw kindly took them in, administered to their wants and they had a good night's rest. The next morning the Indian pointed out the old trail to them, bade them God speed, and they resumed their weary tramp on their road home, where they arrived the same day.

CHAPTER XVI.

EAGLE, JACKSON, AND LIBERTY TOWNSHIPS.

EAGLE TOWNSHIP.

From the records of the county commissioners for the 3rd of December, 1832, we find that "a petition was presented by sundry citizens of the original Township 1 south, in Range 10 east, praying to be organized. Township 1 south, in Range 2 east, was accordingly set off, and formed into a body politic and corporate, and the said township shall be called Eagle."

Eagle Township contains 23,040 acres, and is bounded on the north by Liberty and Findlay, on the east by Jackson, on the south by Madison and Van Buren, and on the west by Union. It takes its name from the creek of the same name which runs through it, and is situated in the first range of townships south of the base line.

The first land entered in this township, was the west half of the northeast quarter of Section 35, by John Woodruff, on the first day of June, 1827. On the 6th day of June, 1829, Elijah Woodruff entered the northwest quarter of Section 13. These farms were afterward owned by William Yates and J. Alspach. On the 7th day of August of the same year, Phillip Heakes entered the lands afterward owned by the heirs of George Arnold in Section 12, and in November of the same year, George Bishop entered the northwest quarter of Section 24—for a long time the John D. Bishop farm and mill. The northwest quarter of Section 9 was entered by Joshua Hedges of Pickaway County, on the 28th of September, 1830, and on the 37th of November, in the same year, Shun Sager entered the west half of the southwest quarter of Section 31. In the latter part of the year 1831, entries were made in Sections 5, 6 and 8, by Jacob Powell, all of Fairfield County, Ohio, and by John Bright in Section 21. Other entries followed, and much of the land in this township was speedily taken up.

The soil of this locality, especially along the Eagle and Tiderishi Creeks, is of a rich sandy loam, and many very valuable farms are located along these creeks. In other parts of the township, a fertile clay predominates which produces good crops of corn, wheat, oats and grass. The surface is quite level, with a tendency to be rolling in the immediate vicinity of the creeks. From the begining of settlement here until within the last twenty years, this township, with others surrounding it, was the center of the "milk-sickness," elsewhere mentioned in this work. The timber was of the prevalent varieties mentioned in other parts of the county, such as walnut, ash, oak, sugar and beech, etc. The timber and vegetation throughout the township was of a large growth.

Eagle Creek and Tiderishi, with their tributaries, furnish an abundance of water for stock and ample outlets for drainage in all parts of the township. Eagle Creek crosses the township from south to north, in the east part, and Tiderishi also from the south, pursuing a northwesterly course, passing out near the northwest corner. These streams, of course, are small, and yet Eagle Creek furnished waterpower for mill purposes for more than fifty years after the first settlement of the country. But by the clearing off of the forests, and the underdraining of the soil, the surplus water fall is now so quickly passed into the streams and flows away, that the time waterpower would be available, would not reimburse the investor for his expense, and consequently all of the water mills, not only in Eagle Township, but throughout the entire county, have been abandoned. Not one remains to tell the tale.

The first settlement made in this township was by John Woodruff in the latter part of 1829, and by John Decker, Benjamin Whitman, Conrod Line, Jacob Zolland, R. W. McClellen, in 1830. These pioneers were followed in 1831 by John D. Bishop, Elias Decker, Amos Crum and others. Most of these first settlers came from Fairfield and Franklin Counties. Whitman was from New York and McClellen was from Pennsylvania. The first settlements were on or near Eagle Creek in the eastern part of the township. The Nunamakers, Heldmans, Arris, Bormuths and others very soon afterward made settlement in the west part, and the Powells and others located on the Tiderishi, in the northwest corner. At the first election in 1833, when the township was organized, there were barely enough electors to fill the offices. Benjamin Whitman, Conrod Line, George Bishop, John Woodruff and John Decker were voters at the election.

The first schoolhouse built within the limits of the township was in the Bishop district in 1834. At that time Mr. John D. Bishop and Benjamin Whitman were the only taxpayers in the district. Rachel McBride taught the first school in this district. There are now nine substantial and comfortable school buildings in the township.

Until 1840, religious services were held in the residences and schoolhouses, no church buildings being erected in this township before that time. In 1840, the United Brethren Church erected a building on the farm of John Woodruff on the east bank of Eagle Creek. It was of hewn logs, small in dimensions, but large enough to accommodate all the religiously inclined of the sparse settlement. Among the first members of this society were Mrs. Woodruff, Conrod Line and wife, and some of the Deckers.

The first mill was known as Decker's hand mill, and here by a great deal of muscular power, corn could be ground fine enough for mush making. It was, however, a slow, laborious process. In 1830 George Bishop erected a saw-mill, and in 1833, a flouring-mill, on the site still known as Bishop's Mill. In 1854, John D. Bishop, who then owned the property, installed steam power, as the mill previous to that time had been propelled by water power. But after a few years' trial he became dissatisfied with this, and removed it, again returning to water power until the mill was abandoned about 1890. Perhaps no mill in the county was of more real benefit, when mills were most needed, than was this one. Not only did the immediate neighborhood patronize it, but people came from a great distance to have their corn and wheat ground here.

Since 1840 the township has developed very rapidly and can boast of some of the richest farmers in the county. Beautiful residences and capacious barns, with other outhouses, were erected and the country has an appearance of wealth and comfort. The soil is rich and easily cultivated, and the people are engaged in the lucrative occupation of farming, and by their industry and proper economy are living bounteously and accumulating wealth. Most of the main roads are now piked and those not so will be soon, and in traveling over the township one can see on every hand evidences of contentment and prosperity.

In 1850 a post office named Clement was established on the Bellefontaine road about six miles south of Findlay, with Amos Crum as postmaster. Mr. Crum was succeeded by John Swank, who held the office until it was discontinued in 1864.

JACKSON TOWNSHIP.

On December 7, 1829, Charles McKinnis, John P. Hamilton, and Mordica Hammond, commissioners, received "A petition presented by sundry citizens of Amanda and Delaware Townships, praying for a new township, to be set off as follows, to-wit: Number 1, Range 11, south of the base line, into a body politic and corporate, and to be named Jackson, which was agreed to by said Board."

At the December session of the commissioners in 1836, it was "ordered that an election be held in Jackson Township, to elect a treasurer and three trustees for Section 16, on the 20th day of December, 1836, and that notices thereof be set up in three of the most public places in the township, that there are twenty electors in the said township, at the usual places of holding elections." It was also ordered "that Sections 3, 4, 5, and 6 in Township 1 south, Range 12 (now Biglick Township), and Sections 1, 12, 13, 24, 25 and 36, in Range Number 11, Township 1 south (now Jackson Township), be attached to Amanda Township."

Jackson Township now comprises Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35, in township one south. It contains 19,200 acres, and was named in honor of Gen. Andrew Jackson, who was then President of the United States. It is bounded on the north by Marion and formerly a part of Findlay, on the east by Amanda, on the south by Delaware and Madison and on the west by Eagle Township.

Peter George made the first entry of land in the township on the 21st day of November, 1823, which entry was the east half of the northeast quarter of Section 35, afterwards owned by G. W. Krout. December 10, 1823, William Greer entered the east half of the southeast quarter of Section 35, afterwards owned by T. G. Hammond.

David Egbert entered the east half of the northeast quarter of Section 2, and in September of the same year Alpheus Ralston entered the southeast quarter of Section 7, upon which he soon afterwards settled and lived on it to his death some years ago. In

November of the same year George Bishop, of Franklin County, took up the southeast quarter of Section 7. These entries were followed by others made by Levi Williamson, William Newell, John Swank and others.

Judge Mordica Hammond, the first white man to settle in the township, came here in 1827, locating on the Blanchard River, in Section 35, there being no neighbors nearer than Mt. Blanchard; indeed but a very small portion of the land in the township had been entered at that time. The Judge resided at the time of his death, upon the same tract of land which he had reclaimed from the wilderness, and converted into a beautiful farm.

Judge Hammond was not long without neighbors. Peter George, William Greer, the Ecberts, Ralstons, Williamsons, Newells, the Missmores, the Treeses and others quickly followed.

This part of the county was heavily timberd with oak, elm, ash, sycamore, walnut, sugar and beech, a large part of which was wasted because of there being no market for it, and if there had been there were no means of transportation.

The soil is rich and productive, especially along the water courses. The population is a purely agricultural one, there being no manufacturing establishments of any moment in the township. There are many valuable farms and beautiful farm buildings here; the township is one of considerable wealth, and its people are industrious and energetic. The township is well drained by the Blanchard River, which passes through from south to north, and by its tributary creeks and runs. Wells which are easily dug or drilled in any part of the township, furnish a bountiful supply of wholesome water. The first schoolhouse was built in 1832, and the first school was taught by the past venerable Aquilla Gilbert. There were then no public school funds, and the compensation was one dollar and fifty cents per scholar, paid by voluntary subscription. The district included all of Jackson and Amanda Townships, and if the schoolmaster boarded around, as was then the fashion, he certainly had to spread himself over a good deal of territory.

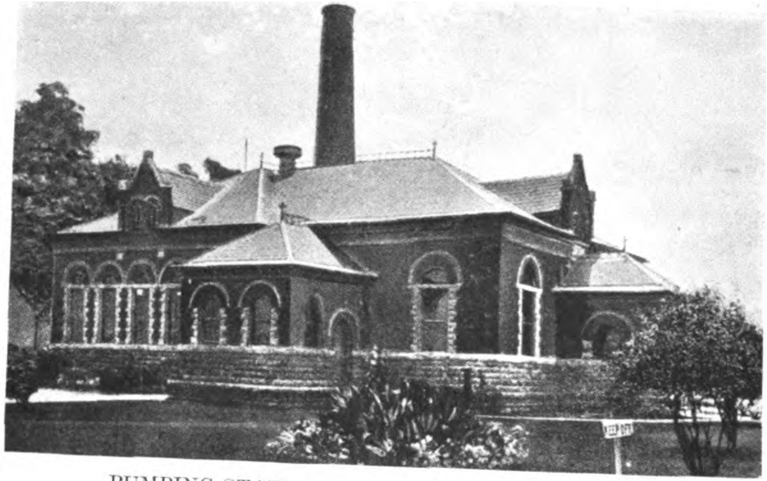
The first church was built in 1833. At an election held in the township in the same year there were ten votes cast.

A hand-mill owned by Godfrey Wolford, was the first in the township, and Mr. Gilbert used to say that he and Judge Hammond, with whom he resided during the winter of 1828-9, used to go to mill every other day to grind enough meal to feed the Judge's family. The first flouring-mill was built in 1835 by Michael Missmore, but as it was propelled by water, it was rather uncertain as a means of procuring bread in seasons of drought. But before the land was cleared of its timber the streams were less liable to floods and droughts, and the people were wont to make provisions for the short time of drought in summer by laying in a stock of meal and flour to tide them over. This Missmore mill was the first frame building erected in the township.

The markets for the first settlers were Portland and Sandusky City, but as was said by one of the old pioneers, it made but very little difference to them where the market was, as they had little to sell.

Aquilla Gilbert and L. P. Hamblin were

FINDLAY HIGH SCHOOL, FINDLAY



PUMPING STATION, RIVERSIDE PARK, FINDLAY

COUNTRY CLUB HOUSE, FINDLAY

ST. MICHAEL'S SCHOOL, FINDLAY

the first couple married in the township, Asa M. Lake, Esq., of Mt. Blanchard, officiating. Capt. Dan. Gilbert, their son, was the first white child born here. Capt. Dan. served through the Civil War in the noted Fifty-seventh O. V. I.

The first death was that of Mrs. Margaret Williams, wife of an old hunter and pioneer. Her remains were interred in what is now the Mt. Blanchard Cemetery.

Among the stalwart pioneers of Jackson Township was Levi Sampson, a man of limited education, but possessed of a large stock of good common sense, sterling integrity, and a perseverance that overcame all obstacles. His life, though one of labor and toil during the first years of his residence here, was so good naturedly enjoyed by him, and so cheerfully did he meet all the hardships and disappointments of pioneer life, that he was known among his neighbors as "Sunny Sampson." He became quite wealthy, and had a well improved farm and good buildings. In 1851, just previous to the adoption of the present State Constitution, he was appointed associate judge, in place of Michael Price, resigned. Judge Sampson died many years ago, sincerely regretted by his many friends and neighbors.

Alpheus Ralston was the son of William Ralston, and was born in Rockingham County, Va., in June, 1801. Whilst quite young his parents removed to Wood County, in the same state, but now West Virginia, where he remained until his twenty-fourth year. In 1826 he came to Ohio, and settled in Pickaway County, and in the same year was married. After a residence here of about four years, he sold out his possessions and coming to Hancock County in 1830, took up his residence in this township, on the same tract of land on which he lived the remainder of his life. At that time his nearest neighbor on the north was Mr. Chamberlain, three miles distant, and Mr. Woodruff, on the south, about the same distance. There were no neighbors on the east narer than the Blanchard River, six miles away; and Phillip Cramer on Tawa Creek, seven miles distant, was the nearest family west.

The Perrysburg and Bellefontaine road was not yet located or opened up, only a wagon track through the woods led to Findlay. Mr. Ralston was at the first election in the township, and with Aquilla Gilbert, Mordica Hammond, the Beards, and others, effected the organization of Jackson Township. His first near neighbors were the Williamsons. Mr. Ralston was the father of eight children, and his son LaFayette succeeded to the farm of his father.

Joseph Newell was born on July 6, 1808, in Shenandoah County, Va., and when six years old, came with his parents to what is now Fairfield County, Ohio. Here he remained until 1836, and was married here. In that year he came to this township and took up his residence on lands entered by him some years previously. Mr. Newell was one of the pioneer Methodists of the township. The year preceding his immigration here, a society had been organized by a Methodist itinerant, of which Mr. Newell's brother James, and two sisters and a Mrs. Bond were members. His wife became a member of the same society the year after they came here, and Mr. Newell a few years later. The first church in the township was built on Mr. Newell's land, and there has been a church, and a regular preaching-place there from that day to the present. Mr. Newell raised a large family and provided liberally for them. He won and retained the friendship of his neighbors and was an honest citizen, a warm friend and consistent Christian. The early ministers, no matter to what denomination they belonged, always found a welcome at his house, and a cordial invitation to its hospitality.

George Treece was born in Pickaway County, Ohio, on January 9, 1827, and in November of the same year came to this county, his father's family locating in Jackson Township. Mr. Treece was one of the largest farmers and land owners in the township. He followed farming strictly during his active life, but the last ten years of his life lived retired in Findlay. His neighbors had great confidence in all he did or said.

The first company muster of the township was held at the house of Aquilla Gilbert, and the company—about fifty men in all—was composed of men from Amanda, Richland and Jackson Townships under the command of Capt. Godfrey Wolford and Lieutenants R. M. Hamblin and Josiah Elder.

Wild game was plenty in all parts of the township; the hunting of it was a source of profit as well as pleasure, and the table of the backwoodsman was scarcely ever without a supply of venison or bear steak, or a squirrel pot pie.

There are now eight school buildings in the township, nearly all of which are brick structures, and the enumeration of youths of school age, amounts to four hundred and ninety-six.

In 1863 a post office was established on the road from Findlay to Mt. Blanchard, about six miles from Findlay, and called Ewing's Corners, with Jesse Ewing as postmaster. The office was, however, discontinued after about eight years. Mr. Ewing was the only postmaster.

North Liberty or Houktown, as it is generally called, was laid out in April, 1853, on a part of Section 27, by J. F. Houk.

In 1867 John Doty and A. M. Houk made an addition of twenty-eight lots in addition to the original plat of fifteen by Mr. J. F. Houk, and in 1869, six more lots were added by Jacob Hoy.

The place never assumed very large proportions or very much importance. It never advanced beyond a cross-road village, and its business was entirely local, being confined to the trade of the immediate neighborhood. Its location is in a rich agricultural district, but remote from the railroad.

In 1856 a post office was established here, under the name of Houcktown, and some of the earlier postmasters were Robert Davidson, J. R. Babcock, John Garst, Israel Sampson, Eli Gorsuch, John Ebaugh, and David Beagle.

LIBERTY TOWNSHIP.

Liberty Township from the organization of the county in 1828, until December, 1830, was a part of the township of Findlay. At the session of the county commissioners, held in that month, present, Mordica Hammond, John P. Hamilton and Charles McKinnis, it was determined that it was necessary to divide the townships of Marion and Liberty into three townships, by taking a strip two by six miles from the western side of Marion township and also a strip two by six miles from the eastern part of Liberty Township, and erecting a new township, Findlay. This township has an area of 15,360 acres.

The first entry of land in this township was made July 3, 1821, by Vance, Neil and Cory, of the southwest quarter of the southeast quarter of Section 8.

Between this time and 1830, the following persons entered land in this township: December 20, 1821, Robert and Charles McKinnis, John Gardner, Jacob Poe, Thomas Wilson, R. L. Strother, Alfred Hampton, John Hobbs, Richard Watson, Isaac Comer, and some others. The first settlement was made in the spring of 1821, by Jacob Poe, and in the fall by Robert McKinnis and his sons, Charles, James, Phillip and John. Some of the descendants of these pioneers still reside on the lands entered by their ancestors. These men were followed by Fishel and his sons, John, Michael and Daniel, and some grown up daughters; Johnson Bonham, John Boylan, Judge Ebenezer Wilson, William Fountain; Richard, William and George Watson; Isaac Strother, Nathan Frakes, Povenmire, John Price; the Radabaughs, Solomon Lee, Abraham Bails and others.

Liberty township was heavily timbered with walnut, ash, hickory, oak, sycamore, beech, sugar poplar and the ever present buckeye. No part of the land was without this heavy timber, and the immense forest trees of walnut, which was made into rails, or even burned up to make way for the plow, to say nothing of fine ash, oak or poplar, which would now be of incalculable value. Along the river, the soil is a rich black, sandy loam and silt, and on the ridges, sandy with a mixture of gravel. Between the ridge and the river, it is a rich vegetable loam, in places mixed with clay. On the north of the river, the prevailing soil is clay, and while not so good for the raising of corn, is excellent for wheat, grass and other crops, as well as fine grazing land. The principal crops are corn, wheat, oats and grass.

The Blanchard River crosses this township from east to west, furnishing an abundance of water for stock and affording a good outlet for under drainage. Formerly it also furnished water for two mills—known as Heck's and Croninger's—for a considerable part of the year, and at which the people got their wheat and corn ground into flour and meal. The river bottom lands are exceedingly rich and productive, but are subjected to occasional overflow, by which crops and fences are damaged more or less.

On the north side we have Watson's, Wilson's, Grassy and Worden's Runs, small wet-weather streams, whose channels furnish good drainage for the adjacent lands. There are several springs along Watson's and Wilson's runs, which keep them supplied with water the year around. On the south side Comer's Run enters the river on the Dye farm, and is the only creek of any importance on that side. None of these creeks furnish waterpower now. There was for a number of years a sawmill on Comer's Run on the old Povenmire farm, just south of the Findlay and Kalida State road, but that has long since been abandoned. On the farm of Nelson Poe, and some forty or fifty feet from the river, is what the people in the neighborhood call a sink hole, that is the water disappears in the ground, and is not seen again until it is emptied into the river.

The first church building in the township was the Blanchard Church on the Ewing farm, on Defiance road, which was built by the Presbyterians in 1850. The congregation, however, previous to that time, held services in private houses, and in the schoolhouse in the neighborhood. The society was organized in 1832 by Rev. Peter Monfort. The first state minister, the late Rev. George VanEmon was at the same time pastor of the church in Findlay. Of the first membership we find the names of Judge Wilson and wife, William Coen, wife and two daughters, Jacob Poe and wife, and Mrs. Judge McKinnis. The following story will illustrate the strictness of church rules, and their enforcement in years gone by:

In early days produce of various kinds was transported to market by being floated down the Blanchard, Auglaize and Maumee Rivers to Perrysburg or Toledo. Mr. William Taylor was in trade at Findlay, and desiring to make a trip, had his fleet of canoes loaded, waiting for a rise in the river, in order to set out on his voyage. After waiting a few days, the favorable time to start came on Sunday and Mr. Taylor being impatient by delays, shoved off his canoes, and silently, perhaps, floated down the peaceful Blanchard, never intending any disrespect to the day or the church. But the church dignitaries could not overlook so flagrant a breach of church regulations and Bible commands, and Mr. Taylor was cited to appear and answer, and to show cause why he should not be visited with penalties of his disobedience. Having presented himself, answered, and confessed, he was forgiven.

The first schoolhouse in the township was built in 1832 on the farm formerly owned by John Reed, Esq. Richard Wade was the first teacher. There are now eight school houses in the township, the most of which are commodious buildings. There are one Evangelical, one United Brethren, one Christian Union, and one Presbyterian Church building, in the township. Each of these churches has a flourishing Sunday school attached, under the charge of efficient and zealous superintendents.

John Byal at an early day built a flour and lumber mill near the present site of the infirmary, these being the first mills in the township. The flour mill was run by water. The machinery was moved by a large overshot, wooden wheel, which kept splashing and creaking all day, and about which there was to the boys always a charming atmosphere of coolness and a capital place for fishing. The water pouring over the dam, not in a rush, but slowly, and at times almost noiselessly, the slow but continued movement of the old wooden wheel, the long drawn-out screech of the wooden machinery of the mill, the quiet movements of the miller—all combined to produce a lazy feeling that affected the boys who sprawled out on the grassy bank of the river, near the old dam, so that it required something pretty exciting to fully arouse them. In about 1844 Miller Johnson built a saw-mill at the site of the Holden Mill, and in about 1853 Amos Hartman, now of Iowa, built a flouring mill at the same place, both of which are gone.

The early settlers suffered much from the wolves, which were very plentiful and also very destructive, killing sheep, hogs and even young cattle. Near where the Blanchard Church now stands Mr. Poe had some young cattle killed by the wolves. Numbers of wolves were killed for their scalps, for which the State paid a bounty.

Indian Green, Plum Orchard, and the Indian burying ground are familiar landmarks in this township. Of the Indian Green, it was said by early settlers, that quite a considerable tract of land on the north of the river had been partially cleared, on which the Indians had a burying ground, and perhaps a village, and certainly some kind of fortifications or earth works. In addition to this there were several acres of lands along the river bottoms which had not only been cleared, but cultivated, as every indication plainly showed.

Whether the presence of so many plum trees was the work of the Indians or of that eccentric person already alluded to—Johnny Appleseeds—will perhaps never be known. The fact remains, however, that they were here, and among them were also a number of good apple trees. The Indian burying ground was frequently visited by members of their tribe—the Ottawas—and at one time a white man by the name of Ellison with his family settled on this ground. Ellison dug up quite a number of skeletons and opened graves for such trinkets as were buried with the dead. This coming to the ears of the Indians, they visited the place and were so emphatic in their denunciation of the vandalism, that Ellison thought it prudent to quit the premises, which he did. This plum orchard and burying ground covered some twelve acres or more.

Among the earliest settlers of this township was also Jacob Poe, a hardy specimen of the backwoodsman. He was a relative of the celebrated Indian fighters, Adam and Andrew Poe, and was possessed of the physical strength and courage attributed to those celebrated brothers. He lived to a good old age, respected and honored.

John Boylan, for more than forty years a resident here came from Newark, Licking County, Ohio, in 1832. He was one of the first school teachers in the county. He was also a local preacher of the Methodist Church, and one of its earliest members in the county. As a minister he was fervent and touching in his appeals, and powerful in his exhortations. After his long residence here he went west, and became a resident of Iowa.

Richard Watson, another early settler, was a good neighbor, an enterprising citizen and honest in all his dealings. He died leaving to his children a fine farm, which he had reclaimed from the wilderness. Mr. Watson, though a strong partisan of the Democratic school of politics, did not attempt to impertinently intrude his opinions on others. He held the office of coroner of the county for one or two terms.

Isaac Comer came to this township from Fairfield County and located on the farm now owned by J. B. Wagner, about four miles west of Findlay on the Benton Road. Mr. Comer was a large, jolly, good-natured man, frank in all his sayings, kind and generous in his acts, and honest and prompt in his dealings. He was universally liked and his death was sincerely regretted.

The Rev. Geo. Van Emon may well be claimed by this township, as nearly all his life in this county was spent here. As a minister he was sincere, and his words carried conviction with them. As a Christian he was blameless; as a neighbor kind and hospitable. He was a citizen whose example might be safely followed.

William Fountain, or the "Old Man Fountain," as he was familiarly called, came to the county in 1830, and settled in this township, on lands on which he resided for nearly fifty years, and up to the time of his death. Of an unassuming and retired disposition, attentive to his own affairs, taking little part in public matters, his acquaintance was never very extensive. But no man in his neighborhood was more highly respected, or considered more trustworthy. Mr. Fountain came from Franklin County and lived to be almost a centenarian. He was born in Caroline County, Md., January 6, 1784, of Irish descent, and was the second of three brothers. In 1809 he was married to Sarah Barton, by whom he had five children. Mrs. Fountain died in 1821 and Mr. Fountain married Mrs. Rebecca Smith, with whom he lived until the time of her death, a period of more than forty years. Mr. Fountain sold his farm in Franklin County and came to Hancock, taking up his residence on the farm on which he died. At the time of his death he was the oldest person in the county.

At the time of the great gas boom in Findlay, in 1887, and the town was building up rapidly and extending its boundaries, the City Council took into the corporation the entire extent of Findlay Township, four by six miles. The city corporation tax being burdensome to the farmers included, one by one or in bunches they applied to be transferred from city to country. As Findlay Township had been disposed of by former enactment, the farms lying west of Main street, and what is known as the Bellefontaine and Perrysburg road through the county, were assigned to their original location in Liberty Township, and in like manner those lying east of said road, which included Main Street in Findlay, were assigned to Marion Township. In this way fully two-thirds of the lands included in Findlay Township originally, and later to the corporation of Findlay, were returned to the two townships out of which Findlay Township was formed.

A large portion of this township has been very prolific in the production of petroleum, and the Standard Oil Company have very valuable leases and property by way of tank farms, pumping stations, and pipe lines located in Liberty Township. Also a great many of the farmers have reaped substantial benefits from the royalty falling to their share of the fortunate find, and a goodly number have retired to a quiet life on the proceeds, many of them moving to the town of Findlay, where as good citizens they are enjoying the evening of a well spent life.

There were no towns ever laid out in Liberty Township, and nothing of a public nature except the County Infirmary has been located therein. Almost all the roads in this township are well piked and in a good condition for travel the entire year.

CHAPTER XVII.

MADISON, MARION AND ORANGE TOWNSHIPS.

MADISON TOWNSHIP.

This township had its origin in 1840, when at the June session of the county commissioners, it was "ordered that Section Nos. 1, 2, 11, 12, 13, 14, 23, 24, 25, 26, 35 and 36 in Township 2 south, Range 10 east, and Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31 and 32 in Township 2 south, Range 11 east, to be set off and constituted as a new township, called Madison." The twelve sections first mentioned were formerly a part of Van Buren Township, and the last twelve mentioned as being in Range 11 were taken from Delaware Township.

This township was named in honor of James Madison, fourth President of the United States. It lies on the south side of the county, and is bounded on the north by Eagle and Jackson Townships, on the east by Delaware, on the south by Hardin County, and on the west by Van Buren Township. Its area is 15,360 acres.

The soil for the most part consists of a compact clay subsoil, covered with a vegetable mold. Along the streams may be found small areas of alluvial land, which is very fertile. The soil in the wet lands consists of a deep black loam, which is very productive when properly drained. Generally speaking the lands of this township can be considered as only moderately fertile.

The timber in this part of the county was hard and soft maple, beech, hickory and ash. The different varieties of oak were abundant in all parts of the township. Black walnut, blue ash and red elm was found along the streams. On the wet lands were black ash and sycamore. This part of the county was very heavily timbered.

Although the township can all be well drained, there are but few streams of water, and they are not of much importance as water courses. Eagle Creek, which is formed by the junction of what is called the east and west branches, which unite about eighty rods northeast of the southwest corner of Section 14, and thence take their course as one creek. Flat Branch is so called on account of the small amount of fall it has. It drains the southeastern part of the township, and is a tributary of the East Branch. Buck Run is in the northeast part, and empties into Eagle Creek, near the north line of the township. The West Branch of Eagle Creek rises in the Hog Creek Marsh in Hardin County, and the East Branch rises near the Hardin County Line.

On the first day of June, 1829, Abel Tanner made entry of the west half of the northwest quarter of Section 23, and on the same day William Y. Woodruff entered the northeast quarter of Section 2. These were the first entries of land in the township.

Squire Carlin on the 9th day of July, 1829, entered the west half of the southwest quarter of Section 11. John Longworth, of Pickaway County, entered the east half of the northeast quarter of Section 5, on the 5th of May, 1830, and in September of the same year, Chancy Rickets entered the east half of the southwest quarter of Section 2. In November, 1832, the northeast quarter of the southeast quarter of Section 5, was entered by Alexander Grant, of Franklin County.

In October, 1834, Robert Hurd and Robert Shaw, both of Portage County, made entries of land in Section 7, and Henry Imhoof, of Stark County, entered the west half of the northwest quarter of Section 6. Other entries speedily followed, and settlements were made in many portions of the township.

According to the most authentic information, Simeon Ramsbottom was the first to settle in this township, though Abel Tanner and Abner Hill came the same year. Tanner came in February, 1825, from near Kenton, Ohio, where he had resided for three years previous. He and his wife were both natives of Rhode Island. He located on the banks of the West Branch of Eagle Creek, near where Gen. Hull camped as he passed through in 1813. Mr. Tanner died in 1833, aged forty-two years, and his wife died three years later. Simeon Ramsbottom settled on the west bank of Eagle Creek, two miles below Tanner. He was a native of Virginia. His wife was born in Ireland. Mr. Ramsbottom died in 1851, his wife having died many years previously.

The family of Abner Hill consisted of himself, his wife and step-daughter. He resided in the township for many years. He committed burglary by breaking into Carlin's Mill at Findlay, for which exploit he was sent to the penitentiary, and was the first person consigned to that institution from this township, or perhaps from the county.

Settlements were very soon after made by Jacob Helms, Benjamin Sparr, Andrew Rickets, John Diller, N. B. Martz, J. W. Williams and others, and farms were opened up all over the township. When N. B. Martz came to this township in 1834, he found a man by the name of John Diller living in Section 11, on lands which he had bought of a Mr. Moreland, who claimed he had purchased them from Simeon Ramsbottom. Mr. Martz said that it was his impression that Ramsbottom was the first settler within the present limits of Madison Township, and that John Tullis came with him. He said also that, from the appearance of the buildings, clearings, and fruit trees when he first saw the Diller's and other places, he was led to believe that the first settlement had taken place at least ten years before that visit.

The Methodists erected the first church building in the township at Arlington, in 1858. It must not be supposed that religious worship was unknown prior to this time, or that no minister had visited this region. Here as elsewhere the schoolhouses and private houses were used as places of worship. There are now four church buildings in the township; two Methodist Episcopal, one Protestant Methodist and one Disciple.

The first schoolhouse built in the township was on the land now occupied as the German Lutheran Cemetery, at the west line of the township. It was of the usual style, of logs, with clapboard roof. There are now eight school buildings, all comfortable and commodious. The first hotel, or tavern, as such places were then called, was kept by John Diller, and was located on the west bank of Eagle Creek, at the place now known as Waterloo. This tavern was called the Cross Keys.

The people of this township devote themselves to agricultural pursuits, and are a peaceable, quiet and thrifty community. Education and respect for the law commands the attention of all. The first settlers were principally from the eastern part of the State and from Pennsylvania. There are, however, quite a number of Germans and their descendants. John W. Williams, one of the early settlers, and proprietor of the village of Williamstown, who died about thirty years ago, at a ripe old age, was perhaps at the time of his death the oldest person in the township. Mr. Williams was postmaster for many years, and was ten times elected justice of the peace. He commanded the confidence and respect of his neighbors, and had many sincere friends.

Christian Welty, an early resident here, was one of those substantial men who sought a home in the then far west. He was a man of good judgment, sound mind and strict integrity.

Andrew Rickets, after a long and useful life, died about 1878, leaving his family a goodly inheritage, accumulated by industry and frugality. His widow, a very estimable lady, and a fair specimen of the goodly dames of the early years of this county, resided and died in Findlay, respected by all who knew her. Mr. Rickets, besides holding several township offices, was for two terms, a commissioner of the county, and filled the office with both ability and fidelity. Robert Hurd, who came to this township in 1839, was born at East Haddam, Conn., March 16th, 1785, and emigrated to Portage County, Ohio, in 1820, and settled in Twinsburg Township, as agent for the brothers, Aaron and Moses Wilcox—twins—from whom the township derived its name. Mr. Hurd made extensive entries of land in and about the present site of the town of Arlington, in 1834, and his sons, William B. and Lorenzo, and son-in-law, Joseph Fitch, at once settled on part of these lands, then all in the wilderness. Mr. Hurd laid out the town of Arlington, and was active in the formation of the township of Madison. For a number of years Mr. Hurd held the office of justice of the peace. He frequently appeared in justice's courts as an attorney, conducting his case with great ability. He died at Arlington in the year 1861.

Napoleon B. Martz was the son of Michael Martz, and was born in Rockingham County, Va., in November, 1809. He came to Hancock County in 1834, and settled on the farm afterwards owned by his son Dorillas. He was married in November, 1830, to Hannah Nicolls, who accompanied him through the journey of life. Mr. Martz was a resident of the county for forty-one years, when he went still farther west, settling in Douglas County. Ill., where he spent the remainder of his industrious life. Mr. Martz' grandparents were from Bavaria, hence his German extraction. He was a man of excellent morals and business integrity, although not a member of any church denomination. He had a fair English education, and strong common sense. His opinions were the result of careful thought, and his advice was sought by his neighbors. Honest, intelligent, social and accommodating, he easily won, and always held the esteem of his neighbors.

MARION TOWNSHIP.

The records of the county commissioners for the session of the 6th day of December, 1830, show the following entry: "It appearing to this Board necessary to divide the townships of Findlay and Amanda into three townships after the following manner, to-wit: Beginning at the southwest corner of Section 31, in Township 1 north, in Range 12, running thence north to the northwest corner of Section 6, in Township 2, in Range 12, thence west to the northwest corner of Section 4, in Range 11, thence south to the southwest corner of Section 33, in Township 1 north, in Range 11, thence east to the place of beginning, which boundary shall be a separate township, and become a body corporate and politic, and shall be known and designated as Marion." The township was named in honor of the dashing South Carolina Ranger, Gen. Francis Marion, of Revolutionary fame, and is bounded on the north by Cass Township, on the east by Big Lick, on the south by Amanda and Jackson and on the west by Liberty and partly by Findlay corporation, and contains about thirty-four square miles.

This township was formerly very heavily timbered with oak, walnut, ash, elm, poplar, beech and sugar maple, together with other trees.

The soil in the northern part of the township is a productive clay, somewhat rolling and well drained, and brings forth fine crops. The river bottoms are exceedingly rich and productive, being a rich sandy loam, and the south end of the township has a soil of very rich, sandy loam. The conditions for the agriculturist are almost ideal and Marion Township farmers are among the princes of the land.

The township is well watered and drained by the Blanchard River and its tributary creeks, Wolf Creek, Prairie Run and Lye Creek. The river enters the township in Section 35, and running a direct course to the north for three miles, where it makes a sudden turn and takes a direct course to the west to the western boundary. Formerly there were mills located on this stream, one three miles east of Findlay, Marvin's and one about six miles from Findlay, known as the Marvin mill. At the present time they are a thing of the past.

Elnathan Cory made the first entry of lands on the 28th day of November, 1822, of the northeast quarter of the northeast quarter of Section 21. On the 24th day of October, Alexander Robertson entered the south part of the northeast quarter of Section 23. Jonas Hartman, of Pickaway County, entered the southeast quarter of Section 24, on the 28th day of April, 1830, and on the 15th day of October of the same year, Rezin Rickets, of Seneca County, entered the west half of the southeast quarter of Section 15. December 28th, 1830, Allen Wisely entered the east half of the southwest quarter of Section 14. Following these were entries made by Jacob Iler, of Pickaway County, Joseph Orwig, Daniel Egbert, Major Bright, of Fairfield County, Nimrod Bright and John Leeder, of Pennsylvania, Isaac Jones, of Richland County, and others.

Marion Township's first settlers were Asher Wickham, Joseph Sargeant and Othniel Wells. These parties settled near the western line of the township—Asher Wickham on the George Burns farm, now owned by Banker E. C. Taylor; Joseph Sargeant on the T. J. Burns place two miles east on the East Sandusky Street road, where it forks with the East Main Cross Street road, and Wells on the Charles Thomas farm at the north end of the bridge crossing the river three miles east of Findlay.

Very shortly after, Allen Wisely, Major Bright, Aaron Baker, Lewis Thomas and others commenced improvement in different parts of the township. Major Bright became the owner of a large tract of land. He at one time held the office of Associate Judge for this county. He was a long resident of the township, and some of his descendants still live in this and Big Lick Township. Perhaps no man in the township was better known, or more generally respected than was Allen Wisely. He owned a very valuable farm on the New Haven road just east of the center of the township, that was well improved and delightfully located. The first church edifice erected in the township was the old Baptist Church opposite the Davis residence, on the Tiffin road. Some years later another hewed log church was built about forty rods west of this, and was used for all orthodox denominations to hold services in. Both of these have long since disappeared but on the spot of the last mentioned stands a very comfortable frame building known as the Union Bethel, where, as before, all denominations worship. In quite an early day there was built on Section 27 a small log church, to which was given the name of Bethlehem, and where the pioneers held service until about 1850 when it was replaced by a frame structure; this in turn gave way to a handsome brick edifice which serves the people of the present day. Besides there is a church in the eastern part of the township known as Mt. Zion. These two churches are both of the United Brethren denomination.

The first schoolhouse in the township was built on William Marvin's farm, in 1836, and the first school was taught by Adam Robinson. There are now seven good school buildings in the township, all brick, and the enumeration of school children amounts to four hundred and twenty-eight.

In April, 1831, occurred the first election. Asher Wickham, Joseph Sargeant, Allen Wisely, John Dewitt, Lewis Ward, Joseph Johnston, Aaron Baker, Major Bright, Adam Beard, Justin Smith, Henry Powell, Edward Bright and O. Wells, were the voters. The immigration to this townshiup came largely from Fairfield County, Ohio.

In 1837 Daniel Opp put up a frame building on the farm now owned by N. A. Morrison, close to the township house, and commenced tavern keeping. A postoffice was also established at this place, and called Crow, with Mr. Opp as postmaster. After about two years, Mr. Opp died, and since then there has been no postoffice in the township.

In 1851, when the writer of this was seven years old, his father's family moved from Carroll County, Ohio, and settled on a farm in Section 10 of this township, and although there had been numerous improvements made, the country was largely uncleared, undrained with no made roads, only the natural ways cut through the woods and along the clearings, with corduroy—logs laid side by side—

through the swampy places and even at that time there was but one frame house in the township, that being the one still standing on E. C. Taylor's farm, in Section 21.

Marion Township has a special pike tax and the citizens in consequence have the benefit of very fine roads. The material for building these roads has been largely taken from a stone quarry owned and operated by Charles S. Johnston living on the Mt. Blanchard road on the banks of Lye Creek. Many miles of stone road has already been made of stone taken out of this quarry, and the supply is inexhaustible for all time to come of the very best material known in the county.

William Marvin and sons owned and operated a saw and grist-mill on the Blanchard River, three miles east of Findlay along in the early fifties. This was sold to William Gillespie and the Marvins built a flouring mill and distillery one half mile farther up the river where the residence of Guy Grable now stands. This mill did a good business in custom grinding and whisky was made out of corn and rye, of a quality that it is impossible to obtain at the present day.

ORANGE TOWNSHIP.

Orange Township had its genesis December 6th, 1836, when the commissioners of Hancock County ordered as follows: "That the original surveyed township Number 2 south, Range 9, in Hancock County, Ohio, be set off into a separate township, politic and corporate, and named Orange. Ordered that the voters be notified thereof, to meet on the third Tuesday in December, A. D., 1836, to elect township officers."

This township is in the southwest corner of the county, and retains its original limits of thirty-six sections, comprising 23,040 acres. It is bounded on the north by Union Township, on the east by Van Buren, on the south by Hardin County, and on the west by Allen County.

The face of the country in this township is generally level, although it has sufficient undulation to render drainage easy and abundant. While the northern part is quite flat, the center and southern portion is beautifully rolling. The soil is varied, but very fertile in all parts of the township. In the northern part was what was called "the marsh," a low, wet tract, formerly utterly unfit for cultivation, until by the expenditure of a large sum of money in ditching and draining, it became one of the richest tracts of sand and vegetable mould in all the county. In other parts of the township the soil is of loam, sand or clay, and sometimes of all combined, but in no part of the township is the soil poor or unproductive. The crops produced are of the principal cereals and vegetables, in abundance and of the best quality, thus showing the varied richness of the soil.

The outlets for drainage are the branches of Riler and Tawa Creeks, both of which flow into the Blanchard River, those of Riley running westward by way of Bluffton and those of Tawa running northward by way of Benton Ridge.

Henry L. Dally, of Tuscarawas County, made the first entry of lands in this township, being that of the southeast quarter of Section 19. This entry was made May 1st, 1834. On the 12th of June, 1834, William Bryan of Richland County, Ohio, entered the south half of Section 6, afterward owned by Beriah Ewing, R. Greer and A. Kimmell—Sopher Ewing, son of B. Ewing now owns his father's farm—David Thompson, of Stark County, Ohio, entered the northeast quarter of twenty—afterward owned by Asa Battles who became a prominent man of the township—and Samuel Thompson, of Columbiana County, entered the west part of the southeast quarter of Section 22. In September of the same year, George McManima, of Richland County, entered the south half of the southeast quarter of Section 17. In August of the same year, John Stump, of Seneca County, took up the northwest quarter of Section 18—afterward owned by Thomas Murray, of Bluffton.

In October, 1834, John Carnahan, of Putnam County, entered the west half of the southeast quarter of Section 7, and Henry Atler, of Pennsylvania, entered the southeast quarter of Section 19, and Joseph Morrison, also of Pennsylvania, entered the northeast quarter of Section 19, and in November, 1834, Simeon Dudgeon, of Knox County, entered the southeast quarter of Section 21. These entries were followed by others, and in a very few years all of the land in the township was taken up.

It is said that in 1833, Henry L. Dally, David Thompson and William Bryan came here and were the first settlers of the township. At that time, and for several years afterwards, the Wyandot Indians claimed the country as a part of their hunting grounds, and were frequent visitors to the cabins of the palefaces, but, as they were peaceably disposed, and honest, they were welcome.

The first settlers were followed by Stump, Shaw, the Battles, the McKinleys, the Marshalls, John Hassan, William Agin, E. S. Crawford, James T. McConnell, James Reed and others, who formed settlements in various parts of the township. James built the first frame building in the township, and James T. McConnell built the first brick one. The first election was by order of the commissioners, in the fall of 1836, at which there were fourteen votes cast. Every voter was elected to an office in the township.

The pioneers of this township early appreciated the blessing of education, and were not unmindful of the moral and religious training of their children, and as a consequence, churches and school houses followed in the wake of the settlement. Next to shelter for themselves and families, they provided these other necessaries to civilization, good order and prosperity. The first schoolhouse was built in 1837. There are nine good schoolhouses in the township, with an enrollment of about five hundred youths of school age. In the early days, teachers in the common schools received fifty cents a day, and boarded around with the families, a week at each place, and were in many families expected to sleep with the children, and have control of them from the time they left home in the morning until they returned at night. The reading of that day was confined principally to the Bible, common school books and occasionally a newspaper. But these, however, were quite sufficient to occupy their leisure hours, which were but few, so busy were they in building cabins, clearing up the ground for cultivation, and assisting their neighbors to do the same.

The Episcopal Church of North America erected the first church building in the township in 1837. There are now quite a number of comfortable places of worship in the township.

The first marriage was that of George McManima, and a Miss Morrison, both of whom have long since passed away, and no known descendants of this union are now residents of this towship. David Thompson was the first white child born in Orange Township, and a Mrs. Ivers, who died in 1838, was the first person who died within its limits.

The first mill was built by John Stump, and there was great rejoicing amongst the inhabitants at its completion, as previously the burden of obtaining flour had been a great inconvenience to the people, owing to the distance to be traveled and the almost impassable condition of the roads, if roads they might be called.

John McKinley, one of the pioneers of Orange Township, was born in Westmoreland County, Pa., September 23, 1801, and at the age of two years came with his father, William McKinley, to Trumbull County, Ohio, then on the frontier of civilization. On the 13th of March, 1823, he was married to Mary Marshall, and in August, 1836, he and his family came to Hancock County. The country was entirely destitute of roads, and Mr. McKinley had to cut his way through the woods to the place where he afterwards resided, camping at night in the wilderness through which he passed. Not in the least discouraged, he at once went to work, and with the assistance of his sons, then mere lads, and the encouragement and assistance of his good wife, he soon opened up a good farm. He lived on this farm until reaching the age of eighty-five, bearing the reputation of being honest in his dealings, frugal, but not stingy, and hospitable alike to neighbors and strangers. Mr. McKinley was present at the organization of the township, and was one of the fifteen voters present. He held the office of justice of the peace for twelve years, and the office of county commissioner for six years. Quite a number of his descendants are still living in the same neighborhood.

Henry L. Dally came to this township from Tuscarawas County in 1833, and his was the first family that settled in this part of the county. The family consisted of himself, wife, four sons and four daughters. The country was entirey new, and they had no neighbors within three or four miles. Mr. Dally was a tall, muscular man, inured to hardships, industrious and honest in all his dealings, and a good neighbor. He located on and cleared up a farm in Section 36. He and most of his family were members of the Disciples Church. After remaining here for nearly twenty years, he became restive, and finally, in 1850, he emigrated to Iowa, and again he became a frontiersman, and was lost to the people of this county.

Isaac Thompson was the second of ten children of David Thompson, a farmer, who came here from Stark County. Isaac was born in Marlboro Township of that county, February 25, 1828, and when five years of age, was brought to this township by his father's family. This family was the second to settle here. As Benjamin Marshall, a pioneer of Union Township, and Josiah Dunlap were coming to this county on horseback, they overtook David Thompson twenty-five miles this side of Bucyrus, O., traveling to his goal on foot, barefooted and bare-headed. They proffered him the aid of money to buy shoes and a hat, but were met by the response that he had plenty money to buy shoes, and as to a hat he declared that he never wore one.

Young Thompson commenced life in the woods, amid all the ups and downs of a frontier residence. He has always followed the independent occupation of a farmer, and became the owner of a very valuable farm of 280 acres, well improved and very productive. Mr. Thompson has a fair common school education, although his entire attendance at school was only fifteen months, and that after he was fifteen years old. He is a man of good natural ability, good business tact, and safe councilor, and his advice and assistance in business matters is sought by his neighbors, with whom he stands high. In October, 1850, he married Louisa McKinley, by whom he had six children, all living.

Mr. Thompson is a member of the Disciples Church, and has been for about forty-three years. His Christian life has conformed to his profession. He is very punctillious in all his business transactions; honest, conscientious and faithful in the discharge of all his duties; firm in his convictions of right, not easily turned aside from what he deems to be right. He has resided continuously in this township since he came here in 1833, and has never been absent from it more than a month at a time. He has been present at every election held in the township, the first of which was held at his father's house. Such is the confidence reposed in him by his neighbors, that he has been called upon to fill almost all the offices in his township. In 1908 he was called on to make a speech at a school reunion, and all present were delighted with the remarks of a man of eighty years old, hale and hearty.

James T. McConnell was born in Pennsylvania in 1809, and came to Orange Township in 1838, and at once commenced clearing up a farm in Section 11. He resided for some years in Jefferson County, Ohio, where, in 1830, he was married to Eliza Dunlevy. Mrs. McConnell died in February, 1862. Mr. McConnell was the father of twelve children, three of whom are still living, Daniel J. and James C. residing in Findlay, and Patrick in Union County. Mr. McConnell always followed the occupation of farming. He had a fair common school education, and was a member of the Presbyterian Church for more than thirty years, and was one of the first members in this township. He was a man of strong convictions, slow to yield a point, and tenacious in his belief. He was a good neighbor, and an honest man. At his death he left a beautiful farm of 160 acres, well improved by his own labor and industry. His first neighbors were John McKinley, Benjamin Marshall, father of John W. Marshall, now residing on Lima Avenue, Willard Boutwell, E. R. Burns, William Ivers, and Thomas Walls; all of whom have passed to the other shore.

On the farm which he cleared up, are to be found some interesting relics of the past. At about the center of the farm is what appears to be an ancient fortification. The earth is thrown up in the shape of a mound or ridge, about thirty feet wide at the top, and scooped out or excavated, the location commanding a view of the surrounding country. In and around this the timber was evidently removed, as the growth of trees, when discovered, was much smaller than that in the forest surrounding. About twenty rods east of this was a mound higher than any other portion of the ridge, and from bones and other articles found in this mound, was evidently the burial place of the dead of those who built the mounds. In the immediate vicinity are other mounds of similar character, all no doubt built by the same people and for the same purpose.

The Northern Ohio Railroad, on its route from Bluffton to Jenera, passes through Orange Township, east and west, on which there are two stations, El Rose and Cordelia. But the farmers do almost all their trading at the two places first named.

Owing to the richness of the soil in this township, the natural roads remained too hard to travel for a good part of the year, as very little had been done by the county in building pike roads. In April, 1896, a special act from the legislature of the State was obtained through the then representative, J. A. Kimmell, empowering the people of this township to levy a special tax for the purpose of improving their roads by the building of stone pike. Considerable opposition was made to the passage of the act on the grounds that such legislation was unconstitutional and that the payment of the levy could be enjoined by any citizen of the township. Nevertheless the bill passed, and the people of the township stood up to it to a man, with the results that today Orange Township has the best and prettiest roads of any township in the county. As one drives along these thoroughfares with a fine pike on one side of it and a fine summer road on the other, lined with beautiful shade trees on both sides, together with the fine buildings of the thrifty farmers with their orchards and gardens of vegetables and flowers, one can imagine he is driving along some grand avenue through some nobleman's estate in a foreign country. The transition that has taken place in these matters since forty years ago seemed like a dream to the writer as he lately passed over the township within the last year. It is certainly a beautiful place to reside in, and the people are to be congratulated upon their pluck and energy in placing it in the condition it is found today.

CHAPTER XVIII.

PLEASANT, PORTAGE, UNION, VAN BUREN AND WASHINGTON TOWNSHIPS. AGRICULTURAL STATISTICS.

PLEASANT TOWNSHIP.

It was ordered by the county commissioners, at their session March 2, 1835, "that the original surveyed Township Number 2 north, in Range 9 east, be laid off and formed in a body politic and corporate, and designated Pleasant Township." Previous to this date it had been a part of Blanchard Township. This township lies in the northwest corner of the county, and is bounded on the north by Wood County, on the east by Portage Township, on the south by Blanchard Township and on the west by Putnam County. It derives its name, no doubt, from its pleasant location and scenery, and is an original township of thirty-six sections. Its area is 23,040 acres; population 2,024.

The soil of Pleasant Township is a rich black loam, on a clay subsoil. On the ridges, or higher lands, it is much mixed and mostly made up of sand and gravel. The entire body of land in this township is rich and very productive. The timber of the virgin forests was very abundant and valuable, but for reasons heretofore mentioned gave small returns to the owners. Some small tributaries of the Portage River furnish ample facilities for drainage of the lands, which are completely underdrained with tile. Many of the inhabitants are supplied with water for domestic use from wells drilled into the underlying rock.

John Algire, of Fairfield County, made the first entry of land in this township, the northeast quarter of Section 31 being bought by him March 15, 1833. On the 20th day of April, the same year, Alexander Kilpatrick, of Hardin County, entered the northwest quarter of the southwest quarter of Section 31. Edward Stevenson, of Franklin County, entered the west half of the northeast quarter of Section 27, and on the same day John J. Needles of the same county entered the east half of the northeast quarter of the same section. On the 19th day of October, 1833, John McCulloch, of Jefferson County and William Woods, of Washington County, Pa., entered lands in Section 28, and on the same day Eliakim Crosby entered the west half of Section 29. Jacob Lamb, of Fairfield County, entered the southeast quarter of Section 30, and George Kalb entered the west half of the northeast quarter of Section 26, on the 2nd day of November, 1838. In 1834 entries of land were made by Henry Hemry, Nathan Fiddler, John Kalb, Benjamin Cummins, Anthony Wilcoxin, Robert

Fletcher, Robert Sherrard, Alexander Amspoker, Benjamin Todd, Bennet Kiger, Michael Price and others.

The first settlement of this township was made in 1833 by Edward Stevenson, Benjamin Todd, and John J. Needles, at and near where the village of McComb now stands. In the following year William and Alexander Kilpatrick, George Algire, John Kalb and Alexander Amspoker, came to the same neighborhood. In 1835 Robert Morrison, John Bartholomew, Charles Blakeman, Michael Price, David Wright, Jacob Thomas and others reinforced the new settlement. Benjamin Todd came from Franklin County, Ohio, and settled on the present site of the village of McComb. He was the first justice of the peace in the township, having helped to organize the township, and held various offices afterward, discharging the duties of all with honesty and fidelity. He was also a member of the first church organization in the township, and ever afterwards led a consistent Christian life, living to upwards of ninety years, having raised a large and respectable family of children, he was loved and respected by all who knew him.

John J. Needles emigrated from Franklin County also, and developed from the wilderness a beautiful farm. He was a rather impulsive, eccentric kind of a man, but withal a kind neighbor and a good citizen. He removed to Iowa in 1856 and there died in 1875.

George Algire resided all his life on the same farm he entered and cleared up. He was a small wiry man of good constitution and untiring energy and industry. He accumulated a competency, and enjoyed it in the society of his many friends. For more than forty eyars he was a minister of the Methodist Episcopal Church. As such he was fervent and zealous, of considerable ability, and led a consistent Christian life. As a neighbor and man he commanded the greatest respect.

John Kalb, another of that noble band of pioneers, after a long and useful life closed up his earthly life on the first of March, 1872. In his death the community lost a valuable member. Mr. Kalb was a member of the Methodist Church for many years, and two of his sons, John S. and Isaac N. were ministers of that church. Father Kalb was a fine specimen of the frontiersman, and contributed his full share in clearing up the country.

The first election was held in 1835 and Benjamin Todd, Charles Blakeman, Michael Price, John Kalb, John J. Needles, Alexander Amspoker, Robert Morrison, Robert Fletcher, Benjamin Cummins, David Wright, and Jacob Thomas were the voters. The officers elected were Benjamin Todd, J. J. Needles and Alexander Amspoker, trustees; Benjamin Todd, clerk; George Algire, treasurer; Benj. Todd, justice of the peace.

The first church organization was in 1835. The Rev. Thrap, of the Methodist Church, at that time organized a class, of whom Benj. Todd and wife, and John Kalb and wife were the members. Services were held in private houses, and in the schoolhouse until 1850, when the Methodists erected a church building, which was the first in the township.

The first schoolhouse was built in 1838 at the present site of McComb. It was of the then approved style, round log, clapboard roof, and chimney order of architect. The township is now supplied with a full complement of fine schoolhouses with an enrollment of an average of four hundred scholars.

The first flouring mill was built by Thomas Pickens in 1845, on Pickens Run. Previous to that time a hand-mill owned by Wiliam Todd, was the only means of making breadstuff in the township. In 1841 George Algire built a saw-mill propelled by water power on Algire's Run. Its capacity for manufacturing lumber was 300 feet per day. The first steam saw-mill was built by Tipton & Porter in 1850, and the first steam flouring-mill by Major Isaac Cusac in 1857.

Thus has this part of the country been developing little by little, with the hardest of labor, the greatest of patience, and most persevering industry, until today Pleasant Township is one of the most populous, wealthy and beautiful in the county. Her farms and farm buildings will compare favorably with those of any other part of the county; whilst in honest thrift, intelligence and true hospitality her people are surpassed by none.

Pleasant Township has two railroads crossing its territory, the N. Y. C. & St. Louis, commonly called the "Nickel Plate," which passes through from east to west, south of the center; and the Deshler branch of the C. H. & D., passing from the southeast to the northwest with the crossing at McComb. These railroad facilities, together with the fine condition of the wagon roads gives to the farmers of this township the greatest convenience for marketing their grain and stock.

PORTAGE TOWNSHIP.

At the session of the County Commissioners in March, 1835, "Ordered that the originally surveyed Township Number 2 north, Range 10 east, be set off into a separate township, politic and corporate, and named Portage. Ordered that the voters be notified thereof, and to meet the first Monday in April to elect township officers." In 1850, on the formation of Allen Township, two tiers of sections on the east side of this township were detached and made a part of that township, so that Portage now includes only twenty-four sections instead of thirty-six that go to make a full township. This township derives its name from some small branches of the Portage River, which arise about the center of the township flowing north into Wood County, and finally into Lake Erie. It lies on the north line of the county, and is bounded on the north by Wood County, on the east by Allen Township, on the south by Liberty, and on the west by Pleasant. Its area is 15,360 acres. The first entry of land was made by Henry Lamb, October 18, 1831, of the south half of Section 19. Henry Culp, of Fairfield County, entered the north-west quarter of Section 20, on the 24th of September, 1830. The east half of the northwest quarter of Section 15 was entered on April 21, 1831, by William Cromlish. July 24, 1832, John Thompson entered the west half of the northwest quarter of Section 22, and on the 19th of August, 1833, John Morehead, of Stark County entered the northeast quarter of Section 22. On the 18th of June, 1833, Samuel Howard, of Richland County, entered the northwest quarter of the southeast quarter of Section 4.

The soil in the northern portion is of sand and loam; the sandy portion is known as sand ridge. The south portion has a preponderance of clay, of a yellowish hue. This clay in some places is mixed with sand and gravel, but all is easily tilled, and exceedingly productive. Until quite recently this township preserved much of its timber in its primeval forests, but in the last twenty years it has been reduced to a minimum. This timber, in the north was sycamore, elm, hickory, oak; in the south poplar, oak, ash, walnut, beech and sugar. This township is drained by the west branches of the Portage River, through which ample outlet is afforded for carrying off the surplus water in wet seasons. Its area is 15,360 acres.

The first settlers in this township were John Thompson, on the farm afterwards owned by James Deter in Section 10, and George McClay on the farm just north, Charles Crist, John and Amos Cooper in 1833, George Taylor, Ezra Hazen on the Edington farm, Robert Walters, Samuel and John Morehead, John Reed, Sr., and a little later on Sanford F. Dulin, George Mitchell, Mahlen Morris, Switzer and John Norris.

Most of these first settlers cleared up their farms and remained living on them their entire life time. Having endured all the labor of removing timbers and draining the soil, they felt inclined to enjoy the fruits of their toil. Their house was their castle. Their rich farms supplied them plentifully with the good things of this world.

Sanford F. Dulin was one of those early settlers who always had faith in the future of this township. He cleared up, and occupied until the day of his death, together with his aged wife, a valuable farm, and to the end was as light hearted and jovial as in his younger years. Close to his farm was a good brick schoolhouse and a comfortable frame church, in the success of both of which Mr. Dulin always felt a deep interest.

John Thompson, after a residence of many years in the township, went further west, where he spent the balance of his life.

John Morehead, who attained a ripe old age, and by industry and frugality coupled with strict honesty accumulated quite a property, passed peacefully away about thirty years ago, surrounded by a number of his children, and in the midst of many friends. John Read too is dead. After improving one of the tracts of land in the township, and rearing quite a large family, he died almost in the prime of manhood, lamented by all who knew him.

Mahlen Morris was one of nature's noblemen. Honest, industrious, intelligent, he was called upon by his neighbors to look after the affairs of the township, in many responsible positions. He was four times in succession elected a justice of the peace, and filled the office faithfully. In 1846 he was elected to the office of county treasurer, and with his family moved to Findlay. In 1848 he was re-elected, and in 1849 he died of an attack of typhoid fever. His loss was universally lamented. Such has been his conduct of the affairs of the office that he had won the confidence of all the people of the county.

The first schoolhouse was near Pleasant Hill, but the exact date could not be ascertained—perhaps about 1834. The second schoolhouse was built in Judge Cooper's district, and the first teacher was Miss Rebecca Hedges. The township is now supplied with its full quota of good brick schoolhouses, with an enumeration of over four hundred pupils.

The first church was built on Sand Ridge in Section 5, by the Presbyterians. Amongst the first members were Miles Wilson and some of his family, and John Norris and wife. The second church was built United Brethren, on Ten Mile in 1836. Treat Demming and wife, and Samuel and Henry DeRodes were of the first membership. The first marriage in the township was that of Amos Cooper and Elisabeth Poe. The first child born was Allen Cooper, son of the Judge, and the first death was that of a child of John Norris. There are many well improved farms, and many good, substantial and comfortable farm buildings in this township, among which, in the past may be mentioned those of Judge Cooper, Adam Crumrine, John E. Morehead, G. W. Montgomery, T. F. Edgington, John Lewis and others. The roads and farms are generally in good condition, and thrift, industry and valuable improvements are seen everywhere, sure indications of the intelligence and prosperity of the people.

There was a post office established in this township in 1860 with Jarvis Humphrey as postmaster. Upon the removal of Mr. Humphrey from the township, Joseph Johnston succeeded him, and held the office until his faculties became impaired by age, so that he was unfit to farther discharge the duties, Mrs. G. W. Montgomery was appointed. Upon the establishment of the rural routes the office was discontinued.

Joseph Johnston, above referred to, was a native of Virginia, where he was born on the 4th day of April, 1801. He was a farmer all his life. His father, Isaac Johnston, moved from Boutetot County, Va., to Ohio in 1811, and settled at Portsmouth, in Scioto County. The elder Johnston was a potter, and followed that trade whilst in Portsmouth. In 1827 the family came to this county, and took up their residence in the village of Findlay. Mr. Johnston was married in 1832 to Susan George, and removed to what is now Marion Township, and in the same year was elected sheriff of the county, which office he filled acceptably for one term. He had for neighbors in this township such men as Asher Wickham, Charles Thomas and E. S. Jones. In 1853 Mr. Johnston sold his Marion Township farm, and moved to this township, where he resided to the time of his death. He had a family of fourteen children, twelve of whom grew up. He was of English descent, but had limited educational facilities, and was compelled to depend upon his own resources in that direction. He helped to build the first schoolhouse in Marion Township and helped to organize, and was a voter at the first election held in the township. He was prominently connected with the early history of the county, and his industry and energy, with his good sense, gave him quite an influence with the early settlers. He lived long enough to see the vast improvements made in the county, and to enjoy the fruits of his labors. His wife died in 1850, and he afterwards married Jane Dudgeon, who died in 1879. In 1863 he was appointed postmaster at Portage Center, which office he held about sixteen years. In 1870 he united with the Methodist Episcopal Church, and remained a member until his death.

Judge John Cooper was a native of Fayette County, Pa., where he was born April 25, 1811. He was the eldest son of James Cooper who came to Pennsylvania from New York. Mr. Cooper's ancestors on his father's side were Scotch, and on his mother's side Low Dutch. In 1812 the family came to Perry County, Ohio, and settled near Somerset. That part of the State was but sparsely settled, and the land which the Judge's father had entered had to be reclaimed from the wilderness, and here the Judge labored until 1832, when he came to this township, bringing with him his young wife, Jane Eliza, daughter of Daniel Cusac, whom he married in 1830. There were but seventeen families in the township, including Portage and the west half of Allen, when he came here. He at once located on the same land where he spent his entire life. Mr. and Mrs. Cooper celebrated their Golden Wedding, at the fiftieth anniversary of their wedded life, 1880, and all their children were present. His first neighbors in the township were John Thompson, Robert Walters and John Howard, and they were about the only residents of what is now Portage township. The Judge held important offices in the township and county. In 1849 he was appointed one of the associate judges of the county and held that office until the adoption of the present constitution. In 1862 he was elected county commissioner, and served six years as such. He was also one the first directors of the County Infirmary. Mr. Cooper had no other educational advantages than that furnished by a common country school, such as they were in those days. He was not a member of any church, but in religious belief he had a leaning to the Old School Baptists. He was always a friend to schools and churches. He was the father of nine children.

Samuel Howard, was the son of a farmer, and was born in Westmoreland County, Pa., December 7th, 1814. He was brought up on a farm, and has followed that vocation all his life. When but a few months old his parents came to Richland County, Ohio. Mr. Howard was the father of eleven children, most of whom are still living. He came to this county in 1833, and settled on what is called "Ten Mile Creek," in this township. They were surrounded by the forests; Indians plenty; game in abundance. Mr. Howard said that when he got up in the morning, and wanted to kill a turkey, he was at a loss to know which direction to go, as they were gobbling all around him. Mr. Howard said that his father had fifty dollars in money when he came here, and that he borrowed it of him to enter forty acres of land on condition that he should keep the family in provisions for one year, and as there were eleven of them in the family, he said it required a great deal of hard labor on his part to do so, especially as flour was sixteen dollars per barrel, and corn one dollar and a half per bushel. The settlers had to go to Tiffin to mill, and to the village of Findlay to trade. In December, 1837, he married Elisabeth Carroll, who died his widow in 1901.

Building a cabin in the woods, he commenced life full of hope and energy, determined to succeed. In 1850, having been elected treasurer of the county, he sold his land and moved to Findlay. He served two terms as treasurer. He then purchased the old Trout farm at VanBuren. After residing here for some years he sold out and bought the Hollenback farm, joining the north corporation line of Findlay, where he resided until 1880, when he moved into town. Captain Howard died March 15th, 1889, beloved by all who knew him, and especially by the old soldiers of the Civil War for whom he always had the highest regards.

Samuel Howard was captain of Company G, 118 Regiment O. V. I., in the late war, and was with that regiment in all its marches and battles until the spring of 1864. In 1863 he was detailed to go to Boston to assist in organizing the drafted men of Massachusetts. He remained for three months, when he rejoined the regiment and went to Eastern Tennessee. In the spring of 1864 he had the misfortune to get his leg broken, and was discharged from the service. He was the father of eleven children, several of whom are living in Findlay at the present writing. The Howard M. E. Church on Cherry Street was named in his honor because of his liberal donations to the society for the buying of the ground and the erection of the building. Also the college campus, a beautiful plat of ground of ten acres, a mile north of the court house, and on which the college now stands, was the free gift of Capt. Howard to the College Corporation, besides contributing quite a sum of money toward the construction of the building. Capt. Howard was always interested in all public enterprises that looked to the advancement of the town or the entire county.

Samuel Morehead, was born in Westmoreland County, Pa., in 1798, and came to Ohio with his father's family in 1814, and settled near Massilon, Stark County. Mr. Morehead lost his mother before leaving Pennsylvania, and his father married again soon after he came to Ohio. He was a farmer, reared to the profession by his father, who followed the same business. In 1821 he married Mary Edger, and in 1834 came to this county, and settled in Portage Township, on the farm afterward owned by his son John E., who died in the spring of 1909. His parents were of Irish descent. The Moreheads are generally large muscular men, endowed with great physical endurance, and industrious, frank, openhearted, liberal and hospitable. They are known for their genial good nature.

Mr. Morehead was a member of the Presbyterian Church for more than fifty years, and was one of the pioneers of that denomination in this part of the country.

His wife died in 1854, leaving two children John E. and Mrs. W. K. Leonard, of Big Lick Township, and he never married again.

The only attempt to build up a town in this township, was by Jacob Andre who laid out a town of seventy-two lots on the south line of Section 15, and called it Lafayette. It had great expectations, but its uneventful history was cut short.

The following is the assessor's report for Portage Township for 1909:

Wheat, acres sown 1,221; bushels produced, 19,200. Oats, acres sown, 1,208; bushels produced, 32,665. Spring barley, acres sown, 16; bushels produced, 360.

Corn, acres planted, 2,384; bushels produced, 87,830. Irish potatoes, acres planted, 50; bushels produced, 3,717. Meadow, acres in grass, 1,889; tons of hay produced, 3,287.

Butter, pounds made in home dairys, 32,300. Eggs, 30,000 dozen.

Orchards—Apples, acres occupied, 128; bushels produced, 3,260. Pears, acres occupied, 3; bushels produced, 90. Plums, acres 1; bushels produced, 80.

Commercial fertilizers, pounds used, 3,500.

Horses, number owned in April, 1909, 255. Cattle, milk cows, 301; all others, 117; total 418. Sheep, 793; pounds of wool shorn, 6,315. Hogs, total number, 648; for summer market, 441.

All of the above items have decreased since 1881, except corn, which shows an increase of 8,000 bushels.

UNION TOWNSHIP.

The origin of this township is found in the records of the County Commissioners of the 4th of June, 1832, where we read: "There was a petition presented by sundry inhabitants residing in the original surveyed Township No. 1 south, in Range 9. praying to be set off as a township under the name of Union, which petition was favorably considered, and they were accordingly set off under the above name."

Union is bounded on the north by Blanchard Township, on the east by Eagle, on the south by Orange, and on the west by Putnam County. It is an original township of thirty-six sections, and contains 32,040 acres.

The soil in all parts of this township is exceedingly productive, especially that along the creek bottom where it is of a dark sandy loam, while the higher grounds are composed of fertile clay sometimes mixed with loam and sand, and is easy of cultivation. The principal crops are wheat, oats, corn and grass. This township is well watered by Ottawa and Riley Creeks, which also furnish good drainage for the adjacent lands, and by the numerous small tributaries that empty into them, assist in the drainage of the entire township.

On the 16th of October, 1829, Phillip Powell made the first entry of land, it being the north-east quarter of Section 2. April 2, 1830, John Bright entered the northwest quarter of Section 22 and in October of the same year, Phillip Cramer entered the south half of Section 1. The west half of the southeast quarter of Section 12 was entered by John Baker, January 30th, 1832, and the same year Richard M. Carson, of Pickaway County, entered the east half of the northeast quarter of Section 4, and Rudolph Snyder entered the east half of the southeast quarter of Section 36. About the same time the southwest quarter of Section 4 was entered by Daniel Tussing, of Fairfield County, and a little later, Abraham Rose, of the same county, entered the northwest quarter of the northeast quarter of Section 36.

Phillip Cramer, who settled on Tiderishi Creek, in Section 1, in November, 1830, was the first white settler in the township. His sons Jacob and Daniel afterwards resided on the same premises. When Mr. Cramer came, he had to make his own road through the forests to his lands—no neighbors, no clearing, all strange solitude under the gigantic trees that at that time stood thick

MAJESTIC THEATRE AND MAIN STREET, FINDLAY

MAIN STREET, FINDLAY

SOUTH MAIN STREET, LOOKING NORTH, FINDLAY

MAIN AND WEST CRAWFORD STREETS, FINDLAY

on the ground, together with the smaller growth and bushes. Mr. Cramer lived to a very old age, and was the pioneer minister of the United Brethren Church. He was a man of some ability, zealous in his "Master's Work," a good neighbor, honest in all his dealings, and much respected by all his acquaintances.

In the following spring, Nicolas Folk, settled on what is now known as the Teatsworth farm, on Ottawa Creek, (Tawa), and in the fall of the same year George Burkett and William Lytle, with their families, settled farther up the creek. Two or three families of the Wades settled near the center of the township. John Flick, and Daniel Fox and others along the creek. Levi Showalter, James Burns, Pancoast, Gibson and Taylor in the western part, and Benjamin Marshall, James West and others in the south part of the township. Benjamin Marshall was the father of our townsman John W. Marshall, now residing on Lima Avenue, and who has told his son that when he passed through Findlay, on his way to his lands there were but fourteen houses all told in Findlay. This was September, 1838.

Wenman Wade was one of that class of robust and pushing frontiersmen, who pave the way for a better civilization and prosperous country, by boldly pushing out into the wilderness, and enduring the hardships and privations of pioneer life uncomplainingly. Honest, industrious and contented, Mr. Wade was one who enjoyed the confidence of the community in which he lived. He held the office of justice of the peace, and is entitled to the distinction of being the first person in the county whose election was contested, as the following notice will show:

"To the Clerk of the Court of Hancock County:—You are requested to withhold the return of the election of Union township, wherein Wenman Wade was elected Justice of the Peace, and the election is contested, and the same contest is to be tried on the 13th of September, 1838.

William Roller,
Asst. Associate Judge."

September the 5th, 1838.

It does not appear who the contestant was, or the grounds of contest. Therefore it is inferred that Mr. Wade established his claim to the office, for in 1841 he was again elected.

Levi Showalter resided in the township until his death, and to the end was a hale, hearty old man, with the same frank, brusque manners, sterling honesty, and neighborly spirit that were always his leading characteristics. He was respected and trusted by all who knew him, and left behind him pleasant memories.

James Burns, one of the best citizens, industrious and honest, after years of toil, accumulated a competency for himself and family, died surrounded by kind friends and neighbors, regretted by all.

George Burket was born in Berks County, Pa., and emigrated to Fairfield County, Ohio, at which place he was married to Mary Fox, in 1831 he came to Hancock, Ohio, with his wife and two children. He settled on the farm afterwards owned by his son Jacob. Mr. Burket was a tall slender man, and of rather delicate health. With the help of his family, he cleared a very valuable farm, at which place he died about 1862.

Jacob Burket, son of George Burket, was born in Fairfield County, in December, 1811, and when about five years of age, his parents removed to Perry County, where he remained until 1831, when he came to this township. When Mr. Burket came, there were but two other families in the township, Phillip Cramer, who resided where his son afterwards resided, and Nicolas Folk, who lived on what is since known as the Teatsworth farm. Mr. Burket was present and voted at the first election held in the township. He said that at that election, Phillip Cramer, Nicolas Folk and George Burket were elected trustees, and Wenman Wade, clerk. Mr. Burket was married in 1832, to Sarah Cramer, by Esq. John Cramer. This was the first marriage in the township. Mrs. Burket died in 1850, and he was again married this time to the widow of Phillip Cramer, Jr. After a long and active life on his farm, Mr. Burket moved to the village of Rawson, where he quietly enjoyed his declining years. He always enjoyed the esteem of his neighbors, and had a host of friends.

Nicolas Folk came from Fairfield County, and took up his abode on Tawa Creek about two miles north of where the village of Rawson now stands on or near the Teatsworth farm, which he entered. Mr. Folk was a small man, rather feeble in health, but succeeded in clearing up the farm on which he lived and died. He was highly respected by all who knew him.

Rev. Richard Biggs was born on the 12th day of November, 1806, in Columbia County, Pa., and died at his home in the town of Rawson, Ohio, on the 18th day of July, 1880. In 1824 he united with the Methodist Church in Northumberland County, Pa. He shortly afterwards removed to Summit County, Ohio, where in July, 1836, he was licensed to preach. In 1838 he removed to Hancock County, and settled near the present town of Rawson. Two years later he was admitted to the Northern Ohio Conference at is session at Norwalk, and for more than thirty years was an itinerant minister, serving charges at Findlay, Kalida, Defiance, Clarksfield, Amherst, Dalton, Congress, Chesterville, Marcellus, Millersburg, Shaneville, Pleasantville, Mt. Blanchard, Arcadia, Adrain, Bluffton, Bettsville, and McComb. Left an orphan when but six years of age, his educational privileges were very limited; yet such was his diligence in his studies, that he began teaching when he was sixteen. He was always a close student, and kept up with the times. He was a man of unyielding rectitude, and pure in his life, modest and retiring in his disposition, yet faithful in the discharge of his duty. He commenced the ministry when it meant hard labor, and little pay; the country being new, the appointments being a long distance apart and the people scattered and poor, yet he earnestly and uncomplainingly toiled to lay the foundation of good society, good government and good morals.

During the Civil War he fearlessly defended the cause of the Government against the opposition in the north, and boldly stood up for "Old Glory" when ministers were obliged to lay their revolvers down on the desk before them when they commenced their discourses, as a menace to those who might want to make trouble when they expressed admiration for the flag and prayed for the victory of the Union cause. His faithful wife passed away in 1883, and of ten children the Rev. Peter Biggs, now residing on Lime Avenue, is the sole survivor.

In 1845, Edson Goit, Esq., a pioneer lawyer of Findlay, erected a flouring mill on Ottawa Creek, Thomas Pickens doing the millwright work. This was afterwards better known as the Teatsworth Mill. It was located two miles north of Rawson, where may still be seen the remains of the embankment forming a part of the dam. It was originally a water-mill, but after its sale by Goit to James Teatsworth, steam power was added, with wood, which was then plenty, used for fuel. The mill was a great convenience to the surrounding country, and its loss—for it was torn down and removed many years ago—was very seriously felt by the people of the country around it.

The first church built in the township was by the United Brethren, and is known as the Clymer Church. There are now ten churches in the township as follows: United Brethren, two; Evangelical, two; Christian Union, two, and one each of the Methodist Episcopal, Methodist Protestant, Church of God, and United Presbyterian.

The first schoolhouse was built at the center of the township, and a schoolhouse has been kept there ever since. There are now ten school buildings in the township, all of them, I believe, of brick, and furnished with furniture of the most modern style. The schools of this township have the reputation of being among the best in the county. The enumeration of children of school age averages about six hundred.

Most of the first settlers of this township were from the eastern and middle counties of the State, and very largely from Fairfield County.

Union Township has three villages within its boundaries, mention of which will be made in another chapter of this work.

VAN BUREN TOWNSHIP.

The records of the county commissioners for March 7, 1831, show the following entry: "A petition of sundry inhabitants of Hancock County was presented for setting off the original surveyed township, numbered 1 and 2 in Range 10, south of the base line, into a township, which was accordingly set off, to be known and designated by the name of Van Buren."

At the March session of 1834 the commissioners ordered that Township 2 south, Range 9, be attached to Van Buren Township, for corporate purposes. This township which was named for President Van Buren, is situated on the south line of the county and is bounded on the north by Eagle Township, on the east by Madison, on the south by Hardin County, and on the west by Orange Township. It contains 15,360 acres.

The timber consisted principally of walnut, the different varieties of oak, ash, maple and elm, with beech, sycamore and buckeye. It required much time and great labor to remove this great mass of timber in clearing up the land and preparing it for cultivation. The soil in the low lands is a black loam, on the uplands clay, but all mingled and enriched by other substances as to be very fertile. The township is watered and drained by Ottawa and Riley Creeks, both of which have their sources here. Good drainage can be had anywhere in the township by these and their small tributaries.

The first entry of land was the northwest quarter of Section 27 on the 4th of January, 1831, by Benjamin Sparr. In April of the same year, Samuel Green entered the east half of the southwest quarter of the same section, and in July, James West entered the east half of the northwest quarter of Section 23. May 16th, 1833, John Diller entered the northeast quarter of the southeast quarter of Section 10 and in December of the same year Solomon Bergman, of Licking County, entered the west half of the southwest quarter of Section 17. Peter Pifer and C. Price, both of Pennsylvania, on the 20th of May, 1834, made entries of land, the one took up the northeast quarter of Section 8 and the other the east half of the northeast quarter of Section 9.

In October, 1834, Robert Shaw of Portage County, Peter Foltz of Fairfield County, Isaac Ashburn of Knox County, Joseph Smith of Columbiana County, Henry Freed and Daniel Besserman both of Stark County, Ohio, made entries of land here, other entries speedily followed, many of them by newly arrived emigrants from Germany.

Nicholas Essinger, Adam Gassman and Peter Pifer made the first settlement here, as early, perhaps, as 1833. Not far from the same time Adam Reddick, Peter and Henry Heldman came in, and were quickly followed by Philip Heldman, Michel and Peter Wilch, all from Germany. Soon the Stinemans, the Freeds and the Bessermans, the Hassons, the Barmouths, the Prices and others, nearly all Germans, followed and began to open up farms. These pioneers were industrious, thrifty, honest and moral, and their robust health, the result of frugal living, their energy and solid strength backed up by a fixed determination to succeed in the land of their adoption, soon enabled them to open up valuable farms, and today we have not a more industrious, honest, peaceable and contented people than those found in this township.

The first log schoolhouses built in the township were at Fulhert's and John Tilles' and were erected about the same time. The schoolhouses here, as elsewhere in the county, followed close on the settlements and these were perhaps built as early as 1834. There are now six schoolhouss in the townhip having a good attendance.

The German Reform Church building at Jacob Traucht's was the first erected in this township. There are now one Methodist Episcopal and one Dunkard, one German Reform and one German Lutheran Church in the township.

WASHINGTON TOWNSHIP.

At the meeting of the county commissioners, on the 5th day of March, 1832, Charles McKinnis and Robert L. Strother, two of the commissioners being present, the following record was made: "It appearing to the Board of Commissioners necessary, that they set off the original Township 2 north, in Range 12 east, which shall be a body corporate and politic, and known by the name of Washington Township." This township was named in honor of the "Father of his country" and is situate in the northeast corner of the county, and is bounded on the north by Wood County, on the east by Seneca County, on the south by Big Lick Township, and on the west by Cass Township. It contains thirty-six sections of land, of 640 acres each, or a total of 23,040 acres.

The soil of this locality is somewhat varied. The entire part of the township, except the north tier of sections, is a heavy clay soil, with patches of vegetable mould in the depressions and along the streams, and occasionally some sand and clay mixed on the higher points. The north tier of sections, from one to six inclusive, has a gravel ridge running through them, covering about one-half of the section, with a narrow strip between the ridge and the Wood County line, of a deep, rich, black vegetable mold. Near the foot of the slope of the gravel ridge, is a strip of red clay, not more than four or five rods wide, but very productive. The surface of the whole township slopes gently to the north to the summit of the ridge, from thence to the north line of the township the declination is more abrupt. The east and middle branches of the Portage River furnish outlets for all the underdrains that the farmers have in place, and sometimes serve as a convenience for watering stock. These branches are now known by the name of Arcadia and Fostoria Creeks, one passing through the town of Arcadia and the other one through the town of Fostoria. The east branch has its source in Section 12, in Big Lick Township, running in a northeasterly course, entering this township, in Section 35, running across the township in a northeasterly course, leaving it near the northeast corner of the county. The middle branch rises at the south line of the township, about four miles southeast of the village of Arcadia, crossing the township, leaving it near the northwest corner.

As these streams are dry in summer time, when there is not plenty of rain, they are not of much account for watering stock, but possess great value as outlets for the drainage of the lands. They form deep cuts through the ridge in the north part of the township, washed out in the past years when the country south of the ridge was a lake, or at least a morass.

The first entry of land in this township was made November 24th. 1830, by Joseph Long, of Fairfield County. Ohio, who made entry of the west half of the northwest quarter of Section 4, and on the same day, Caleb Roller, of the same county, entered the east half of the southeast quarter of Section 5. December 1st, 1830, John Gersuch, of Wayne County. Ohio, entered the northeast quarter of Section 5, and on the 17th day of the same month, he made entry of the northeast quarter of Section 1. On the 17th day of December, 1830, James Connelly. of Richland County, Ohio, entered the west half of the northwest quarter of Section 3.

On the 17th day of March, 1831, the east half of the northeast quarter of Section 2, was taken up by John Norris of Wayne County. Thomas Kelley, also of Wayne County, on April 16, 1831, made entry of the northwest quarter of Section 1, and on the 7th of May of the same year, Richard Cole, of Columbiana County, entered the west half of the southwest quarter of Section 1. These entries were followed in the same year by those made by William Norris, of Seneca County, James G. Wiseman, of Perry County, William Wiseley of Fairfield County, Michael and Liverton Thomas, of Wayne County, John Mackrill, of Richland County, James Beason, David Peters and others.

John Gorsuch made the first settlement that was made in this township, on the northeast quarter of Section 1, in April, 1831. The next settler was James Sweeney, who located on the southeast quarter of Section 4, in the same month, and John Norris settled on the northeast quarter of Section 2, about the first of May; and in the same month, James Wiseman located on the northwest quarter of Section 12. Mr. Sweeney and Mr. Wiseman having come to the township in the prime of manhood, and endured all the hardships of pioneer life, both lived to a ripe old age, and died on the farms they first settled on. Mr. Gorsuch also died many years ago. Mr. John Norris moved to Portage Township, on Section 32, where he died, the oldest of the four pioneers in this township. In 1832 several more families settled in the township, among them those of Jacob Heist and Elijah McRill, William Eckels, William Ferrill, James Bryan, Liverton Thomas, Joel Hale and Elijah R. Anderson.

This township, like almost all the others of the county, was very heavily timbered, the principal kinds of timber being white, red, bur and swamp oak; white, red and hickory elm; white, black and blue ash; white and black walnut; hard and soft maple; wild cherry; shellbark and white hickory, bass wood, cotton wood, sycamore and buckeye. In the early settlement of the township, nearly all this timber was valueless except for fencing, and was regarded as a great drawback in the way of improvements, but such is the demand for timber at this day, that what was then destroyed or wasted, would now bring fortunes to the lucky owners. The first schoolhouse in this township was built in 1833 or 1834, and was located on the northwest quarter of Section 12, on the farm of James Wiseman, afterwards owned by Gov. Foster. The first school in that house was taught by Isaac Wiseman, and was the first school in the township. There are now nine schoolhouses and schools in the township. The enumeration of youths of school age is about six hundred.

The United Brethren have an academy in that part of Fostoria which is situated in this township. The schools of the township are at present in a flourishing condition, and much interest is felt in their success by the patrons. The school buildings are all comfortable and commodious.

The religious sentiment of the township finds expression through seven churches—two Methodist Episcopal, one Evangelican Lutheran, one Presbyterian, one German Reformed, one German Baptist, and one United Brethren.

The first election in Washington Township was held in the fall of 1832, when General Jackson and Henry Clay were national candidates for the presidency. Twelve votes were cast at this election. The names of the electors were John Norris, John Gorsuch, Silas Gorsuch, Nelson Gorsuch, James Sweeney, James Wiseman, Liverton Thomas, Jacob Heistan, Elijah McRill, William Ferrall, James Bryan and William Eckels. The vote stood, as now remembered, Clay eight, Jackson four. If "Young Harry of the West" had met with the same success throughout the entire United States "Old Hickory" would not have his name on the list of men honored with the highest office the greatest Republic in existence can bestow. Liverton Thomas was elected justice of the peace, and was the first elected in the township.

The Lake Erie & Western Railroad runs across the township in a diagonal direction from northeast to southwest, and is paralleled by the Toledo, Fostoria & Findlay electric line throughout. What was called the old Continental Road, graded through from Tiffin, Ohio, to Ft. Wayne, Indiana, in 1855, changed hands in 1880, and is now the New York, Chicago & St. Louis Railroad well known over this part of the United States, was at once completed from Buffalo to Chicago, crosses this township from east to west a little south of the center. Both these roads pass through the town of Arcadia where they cross, making the occasion to build this village. The following incident illustrating pioneer life was formerly related by the Hon. Henry Sheets: "When Jacob Heistand came to this township from Wayne County, he brought with him several head of cows and young cattle, and not having any enclosure in which to keep them, allowed them to roam at large in the woods. He took the precaution, however, to put a bell on one, that he might be able to find them when wanted. But one evening when he went for them, he found that they had strayed farther away than usual, he did not find them until dark, and on his return, in passing around one of the large swales in the neighborhood, he lost his bearings, and the cattle not being very particular as to the course they took, went in an opposite direction from home. Mr. Heistand followed them until late in the evening without coming to his or any other clearing. The woods were infested by wolves, which now commenced to howl close to him; the cattle gathered close about him, through fear of the wolves. Mr. Heistand concluded that he would stay with the cattle, and procured a cudgel with which to keep the wolves at bay. But they becoming more bold, and howling fiercer and fiercer, he concluded to start on again, hoping to strike some clearing, which he happily did in a few minutes, but about four miles from home. The clearing was that of James Wiseman, with whom he remained during the night."

James G. Wiseman was born in Greenbriar County, Va., in August, 1790. He served in the War of 1812 as a cavalryman, under Capt. Lewis. Mr. Wiseman was married in 1814 to Miss Elizabeth Summers, and in September, 1817, removed to Ohio, settling in Madison County. He and his wife made the trip from Virginia to Ohio—a distance of more than four hundred miles—on horseback. After two years' residence he moved to Perry County, where he made his home until the spring of 1831, when he came to Washington Township. Mr. Wiseman was a medium-sized man, rugged and hardy, and well fitted to endure the hardships and privations of frontier life. He was passionately fond of hunting, and was an expert in the use of the rifle, but he never allowed this fondness for sport to interfere with the real business of life, that of making a comfortable home for himself and family. He cleared up a large and rich farm. He was an honest, genial, whole-souled man, ever ready to assist the needy, and no man more fully enjoyed the confidence of his neighbors. Mr. Wiseman died in 1873, and his wife survived him seven years. They were the parents of thirteen children, and lived to see all of them become married men and women except two, one of which died quite young, the other being killed in the War of the Rebellion.

William Church was the oldest of eight children of Collis and Elizabeth Church, and was born in Potsdam, St. Lawrence County, N. Y., February 4th, 1818. His father was a farmer and William followed that occupation until he was twenty-one years of age. He then began to learn the blacksmith's trade, which he followed for many years, and after his return to farming he still did his own blacksmithing, including an occasional job for a neighbor. Mr. Church came to Ohio nearly eighty years ago, the family and household goods making the trip in a wagon. On their arrival in the state, they located in the northern part of Wayne County, near the village of Jackson. Here Mr. Church's mother died. In 1834 the family came to Hancock County and located on the land on which the town of Rawson now stands. Mr. Church came to Findlay and learned his trade with David Webster. In 1840 he married Martha J. Teatsworth, and followed his trade for thirteen years. He then purchased the farm in Liberty Township known as the Burkhead farm. After a residence here of a few years, he sold out and removed to the farm in Washington Township where he resided until his death on September 16, 1903. Mrs. Church died in 1873. They were the parents of four children. Mr. Church was always a man of strict morals, but never united with any church organization; his tendency, however, was toward the Baptist. He owned one of the finest farms in the county, on which are very tasteful and substantial buildings. He was always noted for his honesty and industry. He practiced economy without penuriousness, and hospitality without extravagance.

Charles E. Jordan was born in Belmont County, Ohio, on May 23rd, 1800. He was married to Margaret Moore, February 11th, 1826, who lived until May, 1873, dying at Arcadia, Ohio. Mr. Jordan came to this township October 2nd, 1833, and settled on land adjoining Arcadia, on the farm where his son Capt. John Jordan afterwards died. Mr. Jordan had nine children, two of whom are still living. Although a pronounced disbeliever in the cause of the North during the Civil War, five of his six sons were soldiers in the Union army. James was killed at the battle of Resaca, and John died many years afterward as a result of wounds received in one of the many engagements in which he took part. His eldest son, Daniel S. Jordan, was married to Miss Sarah Catharine Kimmell, in 1853, and for many years owned the farm where Reeves Park is at present located.

AGRICULTURAL STATISTICS.

TOWNSHIPS	WHEAT		RYE		OATS		CORN	
	Acres sown for harvest 1908	Bu. prd. 1908	Acres sown 1908	Bu. prd. 1908	Acres sown 1908	Bu. prd. 1908	Acres planted	Bu. shelled prod. 1908
1 Allen	1,479	25,414	10	60	970	30,592	1,984	85,635
2 Amanda	2,011	29,160	45	735	896	28,776	2,631	114,510
3 Biglick	2,559	44,587	46	721	1,164	42,665	3,213	131,460
4 Blanchard	2,383	31,146	95	1,582	1,860	58,809	4,990	233,177
5 Cass	1,403	24,675	23	225	986	31,876	2,168	80,090
6 Delaware	2,367	31,728	90	1,040	616	14,841	2,875	111,470
7 Eagle	2,270	32,768	35	370	837	28,312	2,819	116,370
8 Jackson	1,603	21,425	...	...	1,195	22,815	2,163	100,380
9 Liberty	1,612	26,375	23	355	1,021	41,110	2,886	136,400
10 Madison	2,297	17,362	123	1,145	452	12,707	1,849	71,660
11 Marion	1,751	24,292	...	...	1,075	39,510	2,844	130,710
12 Orange	1,910	21,275	88	835	1,421	38,495	3,202	123,080
13 Pleasant	2,136	33,255	108	1,192	1,596	67,382	4,552	193,595
14 Portage	1,221	19,200	8	200	1,208	32,665	2,384	87,830
15 Union	2,088	27,594	136	1,930	1,595	54,333	3,754	70,030
16 Van Buren	2,035	21,815	128	1,434	805	20,701	2,253	99,570
17 Washington	1,327	22,920	...	...	703	21,540	1,387	48,608
Total	32,407	454,991	950	11,828	18,400	578,129	47,954	1,934.647

TOWNSHIPS	IRISH POTATOES		MEADOW		CLOVER		
	Acres planted	Bushels prod.	Acres in grass 1908	Tons of hay produced	Acres grown	Tons hay produced	Bushels of seed orid.
1 Allen	17	2,111	1,613	2,130	827	1,265	896
2 Amanda	50	4,565	1,526	2,250	1,519	2,146	1,485
3 Biglick	35	3,553	844	1,056	2,021	2,826	2,023
4 Blanchard	139	12,378	543	697	2,513	3,767	1,668
5 Cass	41	3,472	1,343	2,014	643	1,053	795
6 Delaware	29	3,300	1,533	3,268	1,036	1,487	1,372
7 Eagle	54	4,781	779	993	1,578	806	1,298
8 Jackson	29	2,780	730	837	1,362	1,855	530
9 Liberty	64	5,480	2,364	3,505	343	484	1,032
10 Madison	41	2,865	565	738	1,201	1,702	867
11 Marion	192	21,340	1,947	2,768	1,368	1,934	911
12 Orange	..	....	1,868	2,249	2,081	2,787	1,760
13 Pleasant	38	3,250	822	1,047	2,699	3,465	1,882
14 Portage	50	3,717	1,889	3,287	122	148	29
15 Union	24	2,420	1,068	1,281	1,884	2,816	1,404
16 Van Buren	50	4,411	1,269	1,792	1,389	1,798	1,764
17 Washington	12	1,200	745	801	814	1,009	510
Total	865	81,623	21,263	30,653	23,400	32,348	20,226

TOWNSHIPS	MILK	BUTTER	EGGS	MAPLE PRODTS.		HONEY	BEES
	Gal. sold 1908 family use	Lbs. made in home drs. 1908	Doz. Prod. 1908	No. trees Fm. which syrup	Gallons of syrup 1908	Lbs. honey 1908	No. hives 1908
1 Allen	22,752	40,459	37,470	2,964	1,075	1,560	40
2 Amanda	4,500	60,180	80,900	1,125	500	1,900	85
3 Biglick	....	57,900	64,770	3,849	1,544	1,600	60
4 Blanchard	....	66,150	67,555	365	85	741	49
5 Cass	15,000	46,270	39,100	1,550	172	...	..
6 Delaware	....	37,670	78,980	1,688	727	15	4
7 Eagle	....	46,350	97,900	2,309	794	...	..
8 Jackson	....	32,920	38,300	380	125	...	..
9 Liberty	5,100	74,600	39,345	2,555	960	1,608	116
10 Madison	....	46,800	37,916	950	282	600	20
11 Marion	107,600	44,500	60,300	465	285	3,300	110
12 Orange	....	68,940	102,935	105	60	...	..
13 Pleasant	6,400	44,128	117,395	...	...	...	..
14 Portage	....	32,300	30,000	...	30	...	..
15 Union	....	49,480	76,660	623	197	3,735	180
16 Van Buren	....	60,153	50,450	664	232	3,215	186
17 Washington	4,000	19.980	20,460	96	50	...	..
Total	165,352	828,780	1,040,436	18,688	7,116	18,284	850

TOWNSHIPS	HORSES No. owned in 1908	CATTLE No. owned in 1908	SHEEP No. owned in 1908	HOGS No. owned in 1908	WOOL Pounds shorn 1908
1 Allen	265	570	1,044	1,048	5,508
2 Amanda	490	961	3,202	1,483	25,586
3 Biglick	411	822	1,591	1,087	11,145
4 Blanchard	508	1,723	1,680	2,345	14,379
5 Cass	428	873	1,715	1,649	5,565
6 Delaware	518	1,330	3,514	2,263	22,341
7 Eagle	463	1,326	2,477	2,402	7,510
8 Jackson	426	1,106	3,493	2,003	22,250
9 Liberty	464	977	1,364	1,852	10,963
10 Madison	423	1,098	2,244	1,902	11,161
11 Marion	501	1,136	2,699	1,841	17,830
12 Orange	572	1,498	3,069	2,191	18,370
13 Pleasant	639	1,355	959	2,714	4,736
14 Portage	255	418	793	648	6,315
15 Union	657	1,466	2,690	2,449	13,045
16 Van Buren	433	1,176	2,111	1,981	11,411
17 Washington	356	715	1,275	907	2,360
Total	7,872	18,100	35,920	30,765	210,575

CHAPTER XIX.

TOWNS AND VILLAGES

Sketches of Arcadia, Arlington, Benton Ridge, Cannonsberg, Deweyville, Findlay (Including Gas and Oil Industry and Findlay College), Fostoria, Houcktown, Jenera, McComb, Mt. Blanchard, Mt. Cory, Rawson, Shawtown, Van Buren, Vanlue, West Independence, Williamstown, Etc.

ARCADIA.

This town was laid out in July, 1855, by David Peters and Ambrose Peters. It comprised 135 lots, on the south part of the north half, and the north part of the south half of the southwest quarter of Section 22. Other additions were made by William Wheelan and Charles E. Jordan. The town is located about nine miles northeast of Findlay at the crossing of the Lake Erie & Western and the New York, Chicago & St. Louis Railroads, and has a population of about six hundred. The country surrounding it is rich and well improved, and there seems to be no good reason why Arcadia should not become in time quite a busy place. Its inhabitants are intelligent and enterprising and already quite a large trade is done here. The main street has been paved with brick at a cost of $12,000.

The business of the town is represented by the following concerns:

The Arcadia Bank & Savings Company, with the following officers: Abraham Ebersole, president; John Baker, vice-president; G. W. Dick, secretary and treasurer; Fred P. Conaway, teller. This bank has a capital stock of $25,000, of which $13,750 is paid stock. Two general stores, one drug store, two hardware stores, handling buggies and farming implements, one grocery store, one meat market, two barber shops, two saw mills, one repair shop, one tin shop, one tile factory, one concrete factory, one elevator mill, two blacksmith and wagon repair shops, two livery barns, one electric light plant, two depots.

Arcadia has two churches—one Methodist Episcopal and one Lutheran Church—and one four-room schoolhouse. In Fraternal Organizations there are lodges of the Knights of Pythias, Rathburn Sisters, Maccabes, and Modern Woodmen. There is also located here two doctors, one preacher and one undertaker. The Odd Fellows instituted a lodge here in July, 1874, and had a membership of forty-four, which has since moved to Fostoria.

The Lake Erie & Western Railroad was completed through Arcadia in the spring of

1859. The N. Y., C. & St. L. Railway commenced laying its tracks here on the 28th of May, 1881, and on the 2nd day of June the cars ran across Main Street. The Toledo, Fostoria and Findlay Electric Line runs parallel with the Lake Erie and Western from Findlay to Fostoria.

The town of Arcadia was incorporated in 1859, at which time George W. Kimmel was elected mayor, and Dr. D. B. Spahr, clerk. The office of mayor has since been filled by the following persons: Jacob Peters, Joseph Dillery, E. B. Warner, C. E. Jordan, J. E. Beeson, A. D. Harbaugh, George Stahl, J. W. Fisher, Joseph Dillery, Henry Ludwig, William Karn, J. B. Gordon, R. F. Taylor, Ad. Huffman, J. E. Bricker, W. H. Dillery, the last mentioned being the present incumbent. Joseph Dillery was elected mayor five times and J. E. Bowman was six times elected clerk.

In 1859 a post office was established here with A. W. Frederick, postmaster, who has been succeeded by David Peters, Jacob Peters, William Karn, Joseph Smart, William Moffat, J. H. Beeson, W. Moore, J. H. Wheeland, Harrison Nye, A. M. Nye, and J. C. O'Neil. The last mentioned has resigned and C. W. Blake has been appointed to fill the office.

ARLINGTON.

This town was laid out in November, 1854, by Robert Hurd, Esq., on the southwest part of Section 6, and the southeast part of Section 1. It originally contained seventeen lots, but since its first platting, successive additions have been made, until now it is quite a village, its Main Street extending for a distance of one mile. It is located in Madison Township at the crossing of the Toledo and Ohio Central and Northern Ohio Railroads, and in consequence has ample passenger and shipping facilities. At present there is a good prospect of an extention of the T. G. & S. Electric through the town.

Upon the establishment of a post office here in 1846, Dr. B. Beach was appointed postmaster, and has been succeeded by L. P. Wing, E. B. Vail, W. K. Drake, Thomas Stark, Phillip Wilch, L. S. Lafferty, E. P. Lease, C. F. King, Holmes Wheeler, Levi W. Hinchey and the present incumbent N. D. Stein, who has held the office for the last six years.

The trade of the place was insignificant until after the location of the railroads, when it sprang up by leaps and bounds. The population in 1880 was one hundred and thirty-six, whereas in 1909 it is over five hundred.

In 1892 the town was incorporated and James Huff was the first mayor, he being succeeded in turn by Eli Bowman, Dr. Thomas B. Trovenger, Holmes Wheeler, Dr. John Trovenger, N. S. Wescot, L. E. Huston and the present mayor E. J. Pugh, now nearing the end of his second term.

The finance of the town is being looked after by the Farmers and Merchants Banking Company, incorporated under the laws of Ohio in 1900 with a capital stock of $25,000, surplus of $1,000, and resources of $112,000. The officers are Pres., R. J. Dorney; Vice-Pres., B. G. Bibler; Cashier, H. O. Fellers; and Assist. Cashier, Miss D. Dorcas Dorney. The company owns its own building, a fine pressed brick and glass front, with upper rooms for rent. Societies are represented by the Odd Fellows, with Rebeccas, Maccabees and Ladies, Knights of Pythias with Pythian Sisters, Grand Army of the Republic and Sons of Veterans with the Lady auxiliaries, Modern Woodmen of America.

There are three general stores, two hardware stores, one drug store, one hotel and three restaurants, one shoe store, one clothing store, one furniture store, two milliner stores, one harness shop, one meat market, two grain elevators, two livery barns, two pool rooms, one confectionery store, one bakery, one moving picture show, four barber shops, three blacksmiths, and two coal yards. There are also one saw-mill, with planing-mill attached, one hoop factory, one tinner and roofer, and a stone-crusher on the confines of the village. One stock yard is located here from which are shipped an estimate of one hundred car loads of stock each year, Mr. Isaac Bishop being the main shipper.

Arlington is supplied with four churches, one Methodist Protestant, one Methodist Episcopal, one German Lutheran and one English Lutheran, with two resident pastors. Three physicans look after the physical welfare of the people both in town and the surrounding country. The village prides itslf on having a good schoolhouse of six rooms and an enumeration of two hundred and forty scholars.

In a business as well as in a social way, Arlington is certainly a lively town of its size, and the residents take great pride in the advantages they enjoy. Of course the bulk of the trade is maintained by the farming community, which here is a source of unfailing wealth in this productive country.

Of the twenty-five rural mail routes in the county, Arlington has two—Nos. 14 and 15—that carry the mail to the surrounding farm community.

Arlington also has a municipal Electric Light Plant, built by the town at a cost of $14,000, with which it lights its own streets and furnishes electric lighting to its citizens at a fair rate.

The Arlingtonian, a bright newspaper, is edited by Frank Bitler, who is equal to the task of demonstrating to the public how to run a newspaper.

BENTON RIDGE.

The town of Benton Ridge is situated on the gravely ridge running from Findlay west into Putnam County, and nine miles in a south-westerly direction from Findlay. It was laid out in November, 1835, by William Mires, on the east half of the northwest quarter of Section 35, and was originally composed of but thirty-six lots. In 1855 William Powell made an addition of five lots, and in 1867 he made a further addition of eleven lots, and in 1868 he made a third addition of ten lots. The town was named in honor of the sturdy Missouri Senator, Thomas Hart Benton, who served that State uninterruptedly as U. S. Senator from 1821 to 1851, and was contemporaneous with Clay, Calhoun and Webster. The location is beautiful and healthy, and is surrounded by a rich and productive agricultural country.

The immediate vicinity of the town was settled at a very early day by the Powells—William, Jacob, John and Daniel—David M. Baldwin, Jacob Engle, Solomon Foglesong.

Knepper, Michael Fisher, Owen Hughs and other like enterprising frontiersmen.

The business of the town is confined principally to supplying the surrounding country with some of the most necessary articles of trade. Not having as yet any convenient railroad facilities (a branch of the C. H. & D.—now in the interest of the Baltimore & Ohio system—passing a mile and a quarter north of the village), the town has made advancement slowly, but has held its own, with a steady trend to improvement in building and trade.

A post office was established here in 1840, called Benton Ridge, and D. M. Baldwin, William Miller, Phillip Ballard, Isaac Sperow, M. Merchant, T. J. Saunders, J. G. Saunders, J. H. Saunders, H. W. Hughes, Peter Baldwin, Newton Cherry and J. H Whistler (the present incumbent), have held the office of postmaster.

In 1875 the town was incorporated as a hamlet for special purposes of police protection, and later as a town, with R. S. Palmer as mayor, followed by William Brown, William Wittenmyer, E. M. Jones, A. D. Whistler, Frank Alword, John Westley Powell, Byron E. Powell and the present incumbent, Amos Wittenmyer.

The business of the town consists of two general stores, two meat markets, two drug stores—a small stock kept by each of the two doctors—two barber shops, two blacksmith shops with wagon and carriage repair, with one each of hotel, restaurant, tin shop, bakery, photograph gallery and jewelry, furniture store, fence material dealer, two coal dealers, saw and planing-mill, and a cement block factory.

Benton Ridge is supplied with the Farmers, Bell and Home telephones, with a local exchange of two hundred phones. They have two churches, Methodist Episcopal and Evangelical, one resident minister and two doctors.

The special school district, which composes not only the village, but a large extent of the surrounding farming country, have built a beautiful and commodious pressed-brick schoolhouse at the eastern end of town, with a cement basement and two stories above, comprising four rooms. Surrounding the building are spacious playgrounds and shade trees for the pleasure of the pupils. The enumeration is about one hundred and seventy of school age. The present population of the town is four hundred.

CANNONSBURG.

This town, located in Union Township, was founded by Benjamin Marshall, Franklin Ballard, William McConnell and James C. Marshall. It was laid out on the east part of Section 35 and the west part of Section 36 and consisted of 36 lots, with two streets, or rather roads, crossing at right angles. At one time it was a place of considerable neighborhood importance, and the author has been informed more than forty years ago by some of the then oldest inhabitants that they remembered the time when it was as large as Findlay then was. But it never rose to the dignity of more than a small country village. Railroads came just near enough to it to ruin what trade it had.

In 1867, the author commenced the practice of medicine in this village, and at that time it had two general stores, one grocery and drug store, two churches, two wagon and buggy shops, one blacksmith shop, one grist-mill, one shoemaker, one preacher and three doctors. But all these have passed and in 1908, three of the four corners were planted in crops, and it resembled Goldsmith's "Deserted Village."

A post office was established here in 1841, with Thompson Bartell as postmaster, since which time E. P. Leslie, H. P. Eaton, D. W. Cass, Fuller Ballard, Henry Lue, J. D. Buss, J. A. Combs, Sr., J F. Steinman, J. A. Kimmell, J. A Combs, Jr, and Lydia A. Rossman have held the office. The office was discontinued several years ago.

DEWEYVILLE.

Deweyville was laid out by John B. Williams on the south part of the west part of the southwest quarter of the northwest quarter, and the north part of the west part of the west half of the southwest quarter of Section 15, Pleasant Township. The plat of said village consisting of 40 lots, was acknowledged June 5, 1880, before Edwin Phifer, surveyor, and recorded July 19th, 1880, by Joseph F. Guntzwiler, recorder. This village has not been incorporated.

FINDLAY.

Findlay, now the county seat of Hancock County, was first laid out in the year 1821, by Joseph Vance and Elnathan Cory, and in the autumn of the same year, Wilson Vance and family removed to the place. Mr. Vance was soon joined by Squire Carlin, William Taylor, John Patterson, W. L. Henderson, John Boyd, Reuben Hales and Parlee Carlin, with others, so that in a few years quite a village had sprung up.

The town was replatted in 1829, and on the 26th of September of that year, Joseph Vance and Elnathan Cory appeared before Judge McKinnis, one of the associate judges of the county, and acknowledged the platting of the town of Findlay, consisting of 156 lots of fifty by two hundred feet. The town plat was located on Section 13, in Township 1 north, Range 10 east.

The lands in this section—598 acres in all—were entered in parcels of fifty-five acres by Vance, Neil and Cory, seventy-six acres by McIlvain and Neil, seventy-five acres by Asa M. Lake, eighty-eight acres by John Gardner, one hundred and twenty-seven acres by Elnathan Cory, seventy-nine acres by James Gilruth, and eighty acres by Joseph Westenhaver. John Gardner received a patent for his, dated June 3rd, 1822, signed by President James Monroe. He afterwards sold to Thomas and John Simpson, and they to Wilson Vance, March 14th, 1828. This tract was the west part of the southeast quarter of Section 13, and contained eighty-eight acres. The consideration by Vance to the Simpsons was three hundred dollars. The east part of the southeast quarter, was owned by Vance, Neil and Cory, and was that part of the section on which the town was laid out. The lots numbered on Main Street, from north to south. The lot now occupied by the old Squire Carlin residence—corner of Main and Front Streets, southwest—was No. 1, and the business room of J. S. Patterson & Sons, corner of Main and Sandusky Streets, No. 16, the then southern boundary of the town. In these numbers, from one to sixteen, the Public Square, now the Courthouse Square, was not counted. There were seventy-six lots on the west side of Main Street, the lot on the corner of Front and West Streets being the last number on that side.

On the east side of Main Street, the lot occupied by the Tavern Hotel, is numbered twenty-seven, and on South Main Street the lot on the northeast corner of Main and Sandusky Streets, now occupied by the Frey Drug Co., was numbered ninety-six. There were eighty lots on the east side of Main Street, ending with No. 156, owned by the late Mrs. W. C. Cox, and on the corner of Front and East Streets. No part of the land between Front Street and the river was laid out into lots at that time.

The following certificate of Wilson Vance, surveyor, was attached to the town plat:

"1st. All streets and alleys cross at right angles due north and south."

"2nd. Main Street is one hundred feet wide.

"3rd. Broadway (the space between Main-Cross and Front Streets north of the rear end of the Court House) is one hundred and fifteen and a half wide.

"4th. Main-Cross Street is eighty-two and one-half feet wide.

"5th. Crawford, Putnam, Front, Back (now Sandusky), East and West Streets are each sixty-six feet wide.

"6th. Farmers and Mechanics alleys are each thirty-three feet wide, and all other alleys are sixteen and one-half feet wide."

Attached to the plat, by the proprietors, Vance and Cory, was the following acknowledgment:

"The public grounds, streets and alleys, are to the best of our knowledge, correctly designated by the notes attached to said plat, and are appropriated as public ways for the benefit of said town, and to no other use whatever."

Thirty-nine lots were donated to the county commissioners, in trust, to be sold, the proceeds arising from such sale to be used in the construction of county buildings. The ground known as the Public Square was not named as one of the lots donated for county purposes, and by the terms of the acknowledgment above referred to it was appropriated for public use for the benefit of the town and it so remains, unless a subsequent contract with the proprietors, or the town authorities, placed it in the hands of the county commissioners, of which I have not been able to find a record.

On the 10th day of October, 1829, the commissioners of Hancock County, met "for the purpose of taking into their care their proportion of the town lots of Findlay, which were deeded to said commissioners, by Joseph Vance and Elnathan Cory, and said Charles McKinnis and John P. Hamilton, present, ordered that the aforesaid lots be offered at public sale, on the ninth day of November next. It is further ordered, that the county auditor advertise said sale." On November 9th, 1829, the commissioners, Charles McKinnis and John P. Hamilton, present, proceeded to sell the above mentioned lots, and the following sales were made: Lots 2, 8, 9, 13, 17, 26, 29, 32, 43, 46, 51, 61, 79, 86, 89, 92, 95, 98, 104, 105, 108, 111, 116, 142, 146, 148, 156, sold for prices ranging from five dollars for No. 148, to two hundred dollars for No. 8. The aggregate received was $1,025.40. The first frame house in the town was built by Squire Carlin, and stood on the same lot on which he afterward built the brick house on the southwest corner of Main and Front Streets, and now used for business purposes. This same frame building was afterwards moved to the east side of South Main Street on the north side of the alley between Hardin and Lincoln Streets, and at the present owned by John Parker.

The second frame building was erected by William Taylor, who occupied it as a dwelling, hotel and dry goods store. This building stood on the lot adjoining the Davis Opera House, on the south. Many years ago it was removed to the west end of Sandusky Street, where it was burned down. It was about twenty-five feet square and a story and a half high. As Mr. Squire Carlin built the first frame building, so he also built the first brick building in the town, on the lot aforementioned. This too he used as a dwelling and dry goods store.

Benjamin Cox, the first resident of the town, was also the first tavern keeper, carrying on business in a log house, on the east side of Main Street, between Front Street and the river bridge. The town was then a straggling village of log huts, with streets and alleys impassable the greater part of the year, and with no business to talk of, except some traffic with the Indians and now and then the task of entertaining a lone traveler in his search for a home in the wilderness. As the population increased and buildings multiplied, more room was wanted, and additions were demanded, land holders adjoining the old town platted and offered for sale numbers of lots.

In February, 1830, William Byall's addition of twenty lots was laid out. This addition was on the south side of Sandusky Street, east of Main Street. In 1837 Joseph and Elnathan Cory laid out an addition of forty lots. In 1840 John C. Howard laid out eleven lots, Jonathan Parker eight lots. Cory's addition of thirteen lots was laid out and Baldwin's addition of twelve lots and Vance and Cory's addition of seventy-eight lots were laid out in 1848.

S. & P. Carlin's addition, on the south side of East Sandusky Street, was made in 1848 and consisted of thirty-nine lots and in 1852 they made another addition of twenty-eight lots. An addition of fourteen lots was made in 1854 by Nathan Miller. A sub-division of out-lots was made by J. M. Coffinberry, and Wilson Vance made an addition of 113 lots in the same year. Hurd's addition of four lots and the Western Addition were laid out in 1855.

Byal's second addition was made in 1860 and Vance's addition of 111 lots was made the same year. Cory's addition to Vance and Cory's addition was laid out in 1863. The continuation of Vance and Cory's of forty-four lots was made in 1866. E. Barnd made an addition in 1868. Another continuation of Vance and Cory's was made in 1869. Jones and Adams addition was laid out in 1873 and in 1875 P. Carlin made an addition of seventeen lots.

These various additions met with a ready sale, and are now occupied for the most part by beautiful residences and fine busines houses. Pleasant streets, substantial sidewalks and beautiful grounds all tell of the energy and industry of the owners. The tract of land occupied by these additions was at the early settlement of the place scarcely more than a swamp or swale, worth at most no more than government price, but is now worth many hundreds of thousands of dollars.

EAST FINDLAY.

But the old town and these many additions do not comprise the whole of the town of Findlay. East Findlay—an addition to Findlay—was laid out by James H. Wilson in August, 1847, on the north part of the west half of the northwest quarter of Section 19 and comprised but forty lots. In 1863 the proprietor laid out an addition of thirty-five lots and thirteen out-lots which he designated as the continuation of East Findlay. In October of the same year, Cory's addition to East Findlay consisting of eleven lots, was laid out, and in 1866 Cory laid out nine lots more, and in 1873 he added nineteen additional lots. This addition, or suburb of Findlay, which comprises all that part of the town east of Eagle Creek, is pleasantly located and the principal streets, running east and west, correspond with like streets of the main town. There are a number of comfortable residences here. The streets are wide and bordered with shade trees. There are several manufacturing establishments here, which are noticed elsewhere in this work. The children of this part of town attend school at the Huber building.

Eagle Creek which divides this from the main town, is spanned by three bridges, one at Main Street, one at Sandusky Street and one at Lincoln Street. Along the creek were numerous stone quarries from which a very large portion of the stone used for building and other purposes was taken. In this part of town are located the "Eagle Mills." Also East Lawn, the beautiful residence built by M. B. Patterson, Esq.—a most charming place—is also located on east end of Sandusky Street. The building is a two-story frame with basement, built in a tasteful style of architecture, and surrounded by ample grounds highly ornamented with shrubbery. The grounds also contain a large greenhouse, filled with the rarest plants and flowers, and a beautiful island, surrounded by an ample fish pond. The whole is surrounded by a nicely trimmed hedge.

The magnificent home built by H. H. Albon stands just across the street, on an eminence commanding an extensive view of the town and surrounding country. It is one of the handsomest homes in the county. There are a number of other well arranged and comfortable private residences in this part of town. The ground on which the town is located is high and slightly rolling with a warm, sandy soil. A great many of the business men of the town reside here.

Eagle Mills, the extensive flouring establishment, formerly under the management of McConnell & Kirk, and now owned and operated by David Kirk and Sons, are located here and do a very large business, in the way of merchant and custom work. These mills have long been one of the industries of the town and under whatever management they have been, their work has always been satisfactory. Immense amounts of wheat is here floured and shipped to eastern markets and has always been considered of the best brand.

There was formerly an engine-house here, in which was kept one of the engines of the town under the management of an efficient volunteer company, which has now passed out of existence.

NORTH FINDLAY.

North Findlay, situated on the north side of the river, and a part of the town of Findlay, was laid out in 1854 by William Taylor, who was one of the first settlers of the county and for more than forty years a resident of Findlay. It never had a separate existence as a town. The plat of the original town of North Findlay is in the southwest corner of the west half of the northwest quarter of fractional Section 18 and consisted originally of forty-seven lots. Lot number one is on the northeast corner of Main Street and Center Street (or Tiffin road) and the plat from thence extends north and east. The lots in the original town are nearly all occupied by good substantial dwelling houses and public buildings.

An addition of sixty lots on the west side of Main Street was laid out in July, 1857, by A. F. and D. M. Vance of Urbana, Ohio. This plat had some very desirable building lots and although it was at that time a considerable distance from the main town, lots sold readily and were soon occupied as dwelling places. Just south of this addition was quite a body of land used at that time for farming and pasturage purposes, which was the property of William Vance, of Urbana. Mr. Vance yielding to the demands for platting and selling this tract, in September, 1859, divided the ground into sixty-two lots with the necessary streets and alleys. These lots sold readily and at very good prices.

The land on the east side of Main Street between the river and the Tiffin road, was owned by Judge D. J. Cory, and as this tract separated the new town of North Findlay from the old town, he in March, 1861, laid out nineteen lots, one tier facing on Main Street and one on Center Street. These lots were in immediate demand and sold readily. And almost every one is now the site of a good dwelling house. Such is the beauty of this location, and the character of the improvements thereon, that Main and Center Streets in North Findlay have been long acknowledged as one of the most picturesque spots in the town.

In October, 1860, Edson Goit having purchased the lands adjoining A. F. and D. M. Vance's addition, on the north, laid out twenty-seven lots; and in June, 1864, he added thirty more. William B. Taylor and Aaron Hall became the owners of a parcel of land directly west of Goit's addition and laid out fifteen lots in 1866.

In November, 1874, Judge Cory laid out sixteen lots fronting on Center Street, east of his first addition. And about the same time P. and M. Taylor laid out an addition on the east side of Main Street north of the original plat, and Gray and Patterson laid out lots fronting on Center Street, and on the north side of that street. Thus by successive additions, each addition to satisfy purchasers, has North Findlay become quite an important part of the town of Findlay. The town is regularly laid out, the streets and alleys crossing at right angles. The streets east of Main, commencing at the south are Center, Cherry, and Walnut. Those on the west are Fiar, High, Donolson, Corwin, Fillmore, and Howard. Running parallel with Main are Cory and Clinton.

The Lake Erie and Western Railroad passes through this part of the town. North Findlay is connected with the main town by the magnificent river bridge on Main Street. Whilst there are no pretentions to grandeur in architectural design or magnificence in finish, yet there are very many tasty and comfortable dwellings in this part of town. The streets are beautified by hundreds of shade trees, principally maple and when in leaf, they present a cool and inviting appearance.

On the 17th day of March, 1838, the Legislature of Ohio passed "An Act to incorporate the town of Findlay, in Hancock County." The first section of that act provided that "So much of the township of Findlay, in the county of Hancock, as herein described, to-wit: The S. E. part of the S. E. quarter of fractional Section No. 13, Township 1 north, of Range 11, so far east as the bank of Eagle Creek; also the east half of the N. E. quarter of Section 24, Township 1 north, of Range 10, and also what territory of the N. W. quarter of Section 19 as is situated southwest of Carlin's mill-race, be and the same is hereby created a town corporate, and shall be hereafter known by the name of the town of Findlay." Section 2nd provides for an election at the court house, on the first Saturday in April next, to elect a mayor, recorder and five councilmen.

An act to repeal the charter of the town of Findlay, was passed March 13th, 1843. Why, or by what influence this last act was passed, we are unable to say.

The Legislature, on the 4th of March, 1845, passed another act, entitled "An Act to repeal the act entitled 'An Act to repeal the charter of the town of Findlay,' passed March 13th, 1843, and to declare in force the act incorporating said town, passed March 7th, 1838."

The business of laying out, opening up and improving streets, was carried on through the different administrations and economy in expenditures, and a freedom from indebtedness, characterized the conduct of our municipal affairs previous to the advent of what is now known as the "gas boom," but since that important epoch the same rule of economy has not been observed, and extravagance and its consequent indebtedness have been the rule instead of the exception. Speculators in real estate obtained a majority in the municipal councils and, in order to dispose of the real estate with which they were loaded, imposed expensive burdens on the tax payer. Much of the present debt, however, was run up in the building of water works, in paving streets, building schoolhouses, a high school and a city building.

The following persons held the office of mayor previous to 1858, but owing to the loss of records we cannot give the exact order in which they were elected. John Adams, W. L. Henderson, Abraham Younkin, O. A. Ogden, N. Y. Mefford, Josiah S. Powell, Jacob Carr, and perhaps others. In 1858 Charles Carroll Pomeroy, late of Kentucky, and a most eccentric young man, was elected, but resigned before the end of his term, being succeeded by Ezra Brown. Since then the following persons have held the office of mayor and clerk:

Mayors—Ezra Brown, 1859; Israel Green, 1860; G. W. Twining, 1861, 1863; Jacob Carr, 1864, 1866; N. W. Filkin, 1867; J. A. Bope, 1868, 1869; G. F. Pendleton, 1870; D. B. Beardsley, 1872; Wm. Gribben, 1874; Jacob Carr, 1876; Wm. Vance, 1878, 1880; William W. Siddell, 1882, 1884; Wm. L. Carlin, 1886, 1888; J. R. Kagy, 1889; The. Totten, 1890; Thomas Mehan, 1892; B. W. Waltermire, 1894; Georg Nemeyer, 1896; D. T. Winders, 1898; Geo. Nemeyer, 1900; C. E. Watson, 1902; C. B. Metcalf, 1904; J. B. Walker, 1906, 1908; E. Lincoln Groves, 1910 —.

Clerks—S. F. Gray, 1859; Wm. Klamroth, 1860; H. S. Shannon, 1861; J. P. Dennis, 1862; Sam Huber, 1863; B. F. Kimmons, 1864, 1865, 1866; J. C. Martin, 1867; D. H. Pugh, 1868; E. G. DeWolfe, 1869; Lem McManniss, 1870; J. W. Davidson, 1872; Jesse Wheeler, 1874; J. A. Meeks, 1876; W. T. Platt, 1878, 1880, 1882, 1884; Jacob H. Boger, 1886, 1888, 1889; W. R. Black, 1890; Marion G. Foster, 1892; S. P. DeWolf, 1894, 1896; A. W. Ray, 1898, 1900, 1902; J. C. Eddie, 1904, 1906, 1908.

THE FINDLAY PUBLIC LIBRARY.

The Findlay Public Library threw open its doors to the citizens of Findlay, January 27, 1890. It was an outgrowth of a small library conducted by an association interested in the circulation of books in the community. An act was passed April 16, 1888, by the General Assembly of Ohio, authorizing the establishment of a public library and the election of a library board of trustees, consisting of six members, three from each of the two political parties. The members of the first library board consisted of C. B. Metcalf, president; W. D. McCoughey, J. A. Kagy, W. H. Wagner, Sam W. Mills and Mr. Adams.

The southeast double basement room of the court house was granted by the commissioners for the use of a library and with a nucleus of 900 books from the association, the present library was inaugurated. Miss Nellie Baker was elected librarian. A small fee was charged for the privilege of borrowing the books and it was not until January, 1905, that the system of free library books was established. An additional room was secured from the commissioners to meet the growing demands of the library.

The library now contains over 8,000 volumes with an average circulation of 3.500 per month. Miss May Morrison the present librarian succeeded Miss Nellie Baker in 1902. Miss Ella Maxwell is assistant librarian. The present board of trustees consists of S. H. McLeod, president, Prof. J. F. Smith, Prof. C. T. Fox, Mr. W. S. Neeley, Mrs. G. W. Ross and Mrs. G. F. Pendleton.

FINDLAY COLLEGE.

Findlay College, among the most recent additions to the schools of Findlay, is among the leading educational institutions of Ohio. While the establishment of a college, under the auspices of the Church of God had been in contemplation for many years, the initial movement looking to that end took definite shape in a resolution introduced at the general eldership held at Findlay in 1881. That body authorized the committee on education to take the proper steps to form an incorporation and to select a location for the proposed institution. Findlay was selected as the most appropriate site for the college, and on January 23, 1882, articles of incorporation were filed with the secretary of State, "Findlay College" being the name adopted. The incorporators were Jeremiah M. Corvell, Robert L. Byrnes, Isaac Schrader, Tobias Koogle, Jacob M. Cassel, Anderson C. Heck, John C. Strickler and George F. Pendleton, the four last mentioned being citizens of Hancock County. February 8, 1882, the articles of incorporation were signed and the board of trustees organized by electing Isaac Frazer, president; Eli G. DeWolfe, secretary; and E. P. Jones, treasurer. The first annual meeting of the board was held at Findlay, June 21, 1882, when a permanent organization was effected.

The site selected for the institution was a ten-acre tract lying about one mile north of the court house, situated on the west side of Main Sreet and surrounded on all sides by streets 50 feet in width. This ground was deeded to the Findlay College, July 23, 1882, by Samuel Howard and others; the same being paid for by private donations from the people living on the north side. On Ocotber 18, 1882, the board met for the purpose of considering plans for a college building when those submitted by Mr. Rumbaugh were accepted. The architect was directed to prepare complete plans and specifications and sealed proposals for the erection of said building were ordered to be advertised for. March 6, 1883, the bids were opened, but none were accepted for the reason that they were not within the $40,000 limit which the board by previous resolutions had fixed. The contract was finally let June 20, 1883, to Pierce & Coleman for the sum of $49,000 to be finished according to the plans and specifications. The work was soon afterwards commenced and on Sunday the 25th day of May, 1884, the corner-stone was laid with imposing ceremonies, in the presence of a large number of people. The college was not complete until late in the year 1886, but notwithstanding this fact the college was opened Wednesday, September 1, 1886, with very appropriate ceremony and started off with nearly one hundred pupils enrolled. This edifice of education is now considered one of the finest in the state, and is fully equipped and when completed ready for business cost about $65,000. Under the present management of Rev. Brown, it bids fair to excel any institution of its kind in the state.

THE NEW HIGH SCHOOL BUILDING.

The New High School building had its birth October 18, 1899, when E. C. Miller, N. M. Adams, Ed. Dietsch, Charles A. Ebling, Timothy Fellers, T. E. Gillespie, F. W. Karg, W. W. Shuler, A. W. Brown, and Alvin S. Thomas, members of the board of education of Findlay, passed a resolution to hold an election on November 17th, 1899, at the assembly room to decide the question of levying a tax of $50,000 to purchase a site and erect a high school building. The vote resulted as follows: For high school building, 1,131; against high school building, 446. January 23, 1900, on the seventh ballot, the board decided on West Main Cross Street as the site by a vote of 9 to 5 and ordered the advertisement of bond sale to take place March 1, 1900; said bonds to bear interest at the rate of 4 per cent, payable semi-annually. At the same meeting the board accepted the offer of Sarah F. and Foster Geyer for lots 41, 42, and east half of 43 at $7,500; the west half of 43 of heirs of Elizabeth Snyder at $1,500 and 44 of Minerva Snyder at $3,500, possession to be given not later than March 1, 1900. Cramer and Harpster were employed as architects on January 26, 1900, and at the same session a resolution was adopted offering $25,000 of the bonds to the city at par, also a resolution to advertise for bids for heating said building, to be received until noon, March 5, 1900. The city council at its session held Feb. 7, 1900, accepted the offer of the board of education on the $25,000 worth of bonds and ordered the same to be purchased out of the Gas Bond Redemption Fund, which acceptance was received and adopted by the board, February 16, 1900. At this meeting the plans and specifications of Kramer and Harpster were presented and adopted. On March 5, 1900, the bids for the heating plant were opened and examined and with various exchanges of oratory of various members of the board, lasted four sessions. Nothing, however, was done until March 30, when all bids heretofore received were rejected. April 6, 1900, the board of education passed a resolution for bids for the erection of the new high school building, said bids to be received up to noon of May 11, 1900. On said date the bids were opened and examined and upon the consideration the contracts were awarded May 22, as follows: George J. Horn for excavation, sewers, stone mason work, brick work, plumbing, carpenter work, painting and glazing, structural iron work and electrical work $36,630. J. J. Dutweiler, galvanized iron roofing, curbstone work, and plastering $5,900, total $36,530. At the meeting of the board of education held May 25, 1900, the building and grounds committee reported the refusal of Mr. Dutweiler to enter into contract and the board ordered the entire contract awarded to F. Wentz & Co., of Canal Dover, Ohio, for $6,425 and the contract was entered into and bond given June 22. August 17, 1900, the bids for the second $25,000 bonds were opened and the bonds awarded to the Groghan Bank of Fremont, Ohio, for $25,085 and accrued interest. The building progressed slowly and the final amount paid to the contractor August 23, 1901; the city board reserving $500 until the building was accepted. This amount was not paid until March 6, 1903, which formally accepted the building. The entire cost of the building under the contract was $38,481.23; of this amount $186.23 was extras caused by changes in the original plans. The furniture cost $2,620.50 and the curb, driveways and walks put in by C. B. Metcalf $675.00, making the entire cost of the building ready for occupancy, including the grounds $54,276.73.

August 31, 1901, Findlay accepted the beautiful new high school building as its own—built for the public today and for posterity in the days to come. The dedicatory services were opened by a grand chorus of America, participated by the entire audience. Rev. Manchester invoked the divine blessing. Speeches appropriate for the occasion were delivered by various persons of renown, among whom was the Hon. Mr. Bonebrake, state commissioner of common schools. The school opened on Monday, September 2, 1901, with a large attendance of pupils and from all indications Findlay High School bids fair to equal any of its character in this grand state of ours. Here education, the foundation of our civilization, receives its finishing touches and starts the pupils on the highway to success.

THE GAS AND OIL INDUSTRY.

Although the subject of Natural Gas and Oil belongs to the history of the county at large, yet, as it affected the status of Findlay more than the country where these important products were obtained, we will place its history in the article on Findlay.

This never-to-be-forgotten industry, which caused such excitement the country over, and increased our little village of 4,000 inhabitants to a city of 18,000 population as if the wand of some powerful magician had been passed over our heads and the words "hocus pocus" pronounced with great emphasis, was the supposed everlasting natural gas and oil.

In the autumn of 1836, Mr. Richard Wade, who entered the west half of the southeast quarter of Section 6 in Jackson Township, this county, April 7th, 1836, while digging a well on his farm, and having reached the depth of ten feet, found plenty of water, but the well was abandoned on account of such a strong flow of gas as to render it unfit for use. Mr. Wade conveyed the gas through a wooden box to the end of which he attached a piece of iron tubing, which he would light in order to exhibit the phenomenon to neighbors and visitors.

Two years later, or in the autumn of 1838, Daniel Foster put down a well on the lot now owned by J. M. Curtis, being lot number 171 and situated just north of the present Donnell Block. At the depth of eight feet he struck a very strong vein of gas and had to suspend operations. Covering it over he placed a pump tube, extending under his house from an opening in the well to a point near the chimney and then boring a hole through the floor attached a musket barrel to the pump tube, through which the gas was conducted to near the mouth of the open fireplace. This was the first time that natural gas was utilized in the county, though there were other places in this vicinity where gas was found in wells dug for water supply.

Dr. Charles Oesterlin was the man who had most to do with inaugurating the great gas boom. As early as 1850 he became earnestly convinced and argued that underlying the village was a great natural gas deposit which could be developed by drilling through the supervening rock strata, but the people only laughed and intimated that he was crazy. Dr. Oesterlin, however, continued to advocate his belief until it developed into an absolute fact. While serving in the state legislature Mr. Oesterlin called on the state geologists and informed them that in his opinion their survey of northwestern Ohio was not exactly complete, and that a mighty bed of natural gas lay undeveloped in the vicinity of Findlay. The geologists learnedly replied that whatever natural gas existed at Findlay came from Michigan underneath the bed of Lake Erie and there was not sufficient gas to pay for sinking wells. The doctor bluntly told them they were all mistaken, and time would prove the correctness of his statement, which, in truth, it did.

Early in 1884 Dr. Oesterlin determined to make an effort to organize a company to prospect for natural gas, and approached a number of the citizens and business men with his proposition. The result was that April 18, 1884, articles of incorporation, under the name of "The Findlay Natural Gas Company," were drawn up, signed and acknowledged by Dr. Charles Oesterlin, Charles J. Eckels, Fred H. Glessner, Henry Porch, George W. Kimmel and Peter Kunz in the presence of Jason Blackford and Vincent H. Coons and three days afterwards filed in the office of the secretary of state. The capital stock was $5,000 divided into 100 shares of $50 each.

On the 30th of April the eight citizens of Findlay previously named together with U. K. Stringfellow and John H. Decker entered into a private agreement "to prospect for natural gas, petroleum, coal, minerals and artesian wells (all of which the charter covered) in and about the village of Findlay, Ohio," and share all profits arising therefrom. The subscription book for stock opened July 19, and on the 25th Dr. Charles Oesterlin took fifteen shares, Charles J. Eckles ten; Fred H. Glessner, five; George W. Kimmel, five; U. K. Stringfellow, five; Jason Blackford, two, and Henry Porch, two. Subsequently the following named persons took stock in the enterprise: A. C. Heck, John Ruthrauff, J. W. Zeller, W. H. Faven,

FINDLAY COLLEGE, FINDLAY

ENTRANCE TO MAPLE GROVE CEMETERY, FINDLAY

RESIDENCE PORTION, SOUTH MAIN STREET, FINDLAY

CORY STREET WALK, WEST OF COLLEGE CAMPUS, FINDLAY

W. T. Platt, Edward Dietsch, W. B. Porch, Ernest Bacher, William Edwards, J. W Gassman, Lemuel McManness, C. L. Cusac, Dr. Anson Hurd, John M. Hamlin, Frank Karst, Isaac Hershey, Brownyer & Martin, Mrs. Hariett Detwiler, Mrs. E. H. Young, and B. F. Bolton, some of whom, however, took very little interest in the progress of the work.

August 22, 1884, Dr. Charles Oesterlin, Charles J. Eckles, Henry Porch, Vincent H. Coons, George W. Kimmel, A. C. Heck and U. K. Stringfellow were chosen directors of the company for the ensuing year and at once organized by electing Henry Porch president; A. C. Heck, vice-president; Fred H. Glessner, secretary; George W. Kimmel, treasurer. On September 5th the contract for drilling was let to Brownmyer & Martin, of Bradford, Pennsylvania, at the following prices: $2,200, for 1,200 feet; $2,800 for 1,600 feet, and $3,200 for 2,000 feet. Messrs. Eckles, Coons and Stringfellow were appointed to select a location for the well and chose the site on the land of Dr. Oesterlin, in the east part of the town. Work was commenced at once and at a depth of 314 feet the first vein of gas was struck; the second at 516 feet; the third at 618 feet; oil at 718 feet and the general bed of gas at 1,092 feet. They, however, drilled on to a depth of 1,648 feet which was reached December 5, 1884, and operations stopped. The drilling of the well costing $2,825. Soon after the gas was piped into town and the use of natural gas became a reality. Derricks began to loom up in all directions and the news spread with rapidity over the entire country.

The town began to exhibit an intense and feverish activity. Speculators began to pour in from every direction; syndicates were formed, vast tracts of land were laid out into lots and sale were rapidly made at enormous prices. In the meanwhile other large gas wells were being brought forth by various parties and excitement was running at a very rapid speed, but on the morning of January 20, 1886, when the great Karg well broke forth with its tremendous roar, caused by the escape of 20,000,000 cubic feet of gas, imagine the excitement. The gas was placed under control January 25, 1886, and at an early hour the torch was applied. Then it was that a bright fiery flame shot upward toward the sky to a height of fully one hundred feet and the rushing noise could be heard for a distance of five miles. The light from the flame could be seen for a distance of fifty miles on a cloudy night, and for a considerable distance all about the well, the grass was growing with the luxuriance of May and the water in the river below, everywhere else covered with ice, was as blue and limpid as a lake.

In the autumn of 1886 manufacturing establishments began to locate here and inside of two years Findlay became one of the largest manufacturing cities in the state; glass factories, rolling mills, brick and tile factories, potteries, lantern works, tube works, wire nail factories, indeed all sorts of manufacturing establishments seemed to tumble over each other to gain a foothold in a place where gas seemed to be inexhausitble, and until the days of that great gas celebration over fifty manufacturing enterprises had established a foothold in the great gas center of the world.

June 8th, 9th and 10th, 1887, were probably the three greatest days that Findlay ever witnessed in all her history, for on them we celebrated magnificently the anniversary of the first application of natural gas to the mechanical arts. The first day a large procession headed by five enormous bands formed in the front of the Chamber of Commerce, from which point they proceeded to and laid the corner stone of the Lagrange rolling mill amid appropriate ceremonies. Owing to the extreme heat the ceremony at this place was made to answer for the similar occasion at the Moore Chair factory, Union Boiler Works, Ohio Coil and Cable Chain Works, and Findlay Door and Sash factory. At 1:30 o'clock in the afternoon the same bands together with a larger procession marched to Camp Garfield at the Fair Grounds and enjoyed a very interesting time in a military contest.

Early in the evening the immense crowd of people who had come in on all the trains was largely augmented by our citizens from the country who came in to see the sights and long before dark the broad Main Street of our city was a living moving mass of humanity for over a mile in length. Doorways and windows and every point of observation were crowded. "What a magnificent sight," "What a wonderful spectacle," were the exclamations heard on every side when the gas was lighted on the many arches which spanned Main Street and when the gas was turned on in the standpipes from the wells the crowd for a moment stood quiet with fear and awe and then were heard murmurs, and exclamations of surprise on every hand.

The spectacle was grand beyond words to tell or brush to paint. There were eighteen arches spanning the streets, each with half a dozen flambeau flames from the top circle while on each side of the arch there were two dozen burners with different colored globes. Added to these were thousands of burners on the buildings along the streets and to this was added the roar and flames of a dozen gas wells. The stars in the heavens were paled with the effulgent light of nature's last and best gift to man—natural gas.

For three long-to-be-remembered days, did this gala affair last. Speeches, fireworks and contests were the order until the evening of the third day when the crowd began to disperse, the sound of music gradually died away and later on the stillness of night seemed to say " 'tis done." This was the height of the great gas boom. It held up on a level for a year or more and with the decline of years the gas has gone glimmering. But thanks be to him who controls the affairs of man, oil has taken its place and in a more permanent and staple form.

Daniel Dixon, an old time citizen of Findlay, while passing by an old abandoned well near the present site of the rear of Frey's drug store, one winter morning in 1859, noticed a strong gaseous odor coming from it. The oil excitement was then at fever heat, owing to some very rich discoveries in Pennsylvania, and thinking that perhaps he had found a sign of the much sought for article Mr. Dixon procured an iron bar and began forcing it through the debris. A passerby who noticed his actions inquired the meaning of the vigorous probing. Mr. Dixon with a twinkle in his eye, responded, "It's oil, Squire, it's oil." In fact it was the odor of gas but the greasy substance that came with the gas was oil. In 1861 an oil company was organized with the following citizens as stockholders: Wm. H. Wheeler, Robert S. Mungen, U. G. Baker, C. A. Crominger, Albert Langworthy, David Croucher, H. P. Gage, E M. Burkle, Wm. Mungen, J. B. Horn & Co., Wm. Vanlue, Jesse Wolf, Frederick Henderson, George H. Crook, Israel Green, Jesse Guise, Henry Brown, Isaac Davis, Dr.

Bass Rawson and William C. Cox, all of whom are now dead.

The Company was organized by electing Israel Green president; Robert S. Mungen secretary, and E. M. Burkle, treasurer. The spot selected for the well was a few rods southeast of the Presbyterian Church, but this idea was abandoned owing to the breaking out of the war and was never resumed. In 1864 a well was started on the Jacob Carr property by two men from Calliopolis, Ohio, and sunk to the depth of 141 feet when the drill stuck and the well was abandoned. This was done by a spring pole process. Other oil companies were afterwards organized but nothing ever came of them until the drilling of the Oesterlin gas well in 1884 when at the depth of 718 feet a flow of oil was obtained.

The industry, however, did not develop to any large proportions until about August, 1886, owing probably to the low price of the powerful fluid. At present, go where you may over this grand county of ours and you will see oil derricks dotting the surface of the earth, in village-like formation, giving to the entire county an appearance of the top covering of one of the best oil reservoirs located anywhere in the Buckeye State. "Not only this, imagine the thousands upon thousands of dollars expended in prospecting for this hidden treasure; also the thousands upon thousands of dollars of reward in return; the hundreds of families and individuals who have made their fortune from some so called 'streak of luck,' and the hundreds of innocent children and loving wives fed and clothed from the profits realized from this rather undoubtful adventure. But long may she live and continue to bless the households of this, one of the greatest, grandest and noblest counties on the face of God's green earth."

An account of the banks and manufacturing industries of Findlay may be found in separate chapters of this volume under appropriate headings.

FOSTORIA.

This town, formerly known as Rome, in Seneca County, and Risdon in Hancock County, was laid out by John Gorsuch on the east part of the northeast quarter of Section 1 in Washington Township, Hancock County, and the west half of the northwest quarter of Section 6 in Louden Township, Seneca County. The plat of the present Fostoria, consisting of sixty lots, thirty in each county mentioned, was acknowledged September 6, 1832, before William L. Henderson, a justice of the peace, and recorded September 10, 1832, by Wilson Vance, recorder.

After a separate existence of about thirty-five years, the two towns were united under one name and named in honor of their eminent townsman, Hon. Charles Foster, born in Ohio in 1828, who was a member of Congress from 1870 to 1876, and served on the committee of Ways and Means. He was governor of Ohio from 1879 to 1883, and from 1891 to 1893 was secretary of the treasury in Harrison's cabinet. Fostoria has ample railroad facilities, having five steam roads converging and crossing here. as well as three out-going of electric lines. The town has a goodly number of important manufacturing plants, all in a prosperous condition. The population is about 8,000.

HOUCKTOWN.

This village, located in Jackson Township, and sometimes called North Liberty, was laid out in April, 1853, by J. F. Houck, on the northwest part of the west half on the northwest quarter of Section 27, and originally consisted of fifteen lots. In 1867, John Doty and A. M. Houck made an addition of twenty-eight lots, and in 1869 six more lots were added by Jacob Hoy.

The place never assumed very large proportions or very much importance. It never advanced beyond the proportions of a cross-road village, and its business was entirely local, being confined to the trade of the immediate neighborhood. Its location is in the midst of a rich agricultural district, but remote from railroads. It has always contained the usual general store, blacksmith shop, shoe shop, etc.

There is one church and a schoolhouse and most of the time a physician has resided there to look after the wants of these bodily afflicted. The town, so far as improvements in the way of new buildings are concerned, is at a standstill, and the population is about one hundred.

In 1856 a post office was established here under the name of Houcktown, and the postmasters have been as follows: Robert Davidson, J. R. Babcock, John Garst, Israel Sampson, Eli Gorsuch and David Beagle. In 1904, owing to the establishment of the rural delivery service, the office was discontinued.

JENERA.

The record of the laying out of this town, of Van Buren Township, is dated April 14, 1883. The number of lots is not stated, but the ground allotted is given as seven and forty-hundred acres, about equally divided between Peter Traucht, Samuel Fellers and John Heldman. It is located on the Northern Ohio Railroad in a rich farming community, formerly known as the German Settlement, for the reason that almost all the pioneers were Germans from Hesse Darmstead, Germany. All were poor when they arrived in America, but with the characteristic German industry and frugality they soon cleared up the land, built fine houses and barns that for permanence and stability were better than the common average of buildings in the surrounding neighborhood.

A postoffice was established here in 1884 with George Pifer as first postmaster, followed by George Gasman, Adam Hull, Adam Gasman, William Diller, and Elmer Diller, the present incumbent. In 1892 the town was incorporated, and B. C. Steinman was the first mayor, followed by D. E. Hull, H. O. Fellers, Andrew Hull, and the present official Dr. John L. Higbie, who is at present serving his second term.

A private bank was opened up here in 1900, and did a good business until 1909, when it was incorporated under the laws of Ohio, with the following persons as directors: John VonStein, A. H. Good, John L. Higbie, Jacob VonStein, Adam VonStein, A. J. Gasman, and John Heldman. The officers are: President, John VonStein; Vice-President, John L. Higbie; Cashier, A. H. Good; and Assistant Cashier, Mrs. A. H. Good. The capital stock is $25,000 of which $15,000 is paid in.

The People's Telephone, a branch of the Bell Telephone Company, has been in operation here for nine years, and has an exchange of two hundred and fifty phones. It operates with seven other exchanges, and nearly every farmer in the southern part of the county. Oscar Wise of Mt. Blanchard is the general superintendent.

The town has two general stores, two groceries, one hardware, harness and farm implement store, Farmer's Banking Company, one good brick hotel with modern appointments, such as heating plant, hot water, etc., one restaurant, one pool-room, meat market, shoe store, barber shop, planing-mill with wood work, saw-mill, paling and stave factory, feed and livery barn, grain elevator and coal yard.

There is an elegant brick church and parsonage belonging to the German Evangelical Lutheran Church and a good frame church building of the Methodist Protestant denomination. There are two resident ministers, two doctors and one undertaker. For the benefit of educational purposes there is a comfortable two-room schoolhouse and the Knights of the Maccabees have a thriving lodge here.

As previously mentioned, the people being descendants of the frugal Germans, are ambitious and industrious, thus driving business with a vim and intelligence that gives life and prosperity to the prosperous village of Jenera. The town was named in honor of Dr. A. B. Jener, the first physician to locate here.

MC COMB.

Benjamin Todd laid out a town on the northeast part of the west half of the northeast quarter of Section 26, in 1847, and called it Pleasantville. The town originally was composed of only eighteen lots. Afterwards successive additions were made by Mr. Todd, Ewing, Rawson and others. The town is pleasantly situated on the ridge running from Tiffin to Ft. Wayne, and about ten miles from Findlay. McComb is the largest town in the county outside of Findlay, and being situated in the midst of a good farming country, and having good railroad facilities has grown to be a place of considerable importance.

This town was incorporated in 1858, when the name was changed from Pleasantville to McComb. The first mayor was William Chapman.

For many years this town watched and waited for the completion of the Continental Railway, which had been graded for miles, both east and west of the village, alternately between hope and fear, the energies of the place became paralyzed, business gradually fell off, and a state of retrogression was setting in. The people, however, appreciating the situation, roused up and procured the building of the McComb and Deshler branch of the Cincinnati, Hamilton & Dayton road, and thus obtained communication with the outside world, and, as if fortune was now determined to smile upon them, the Continental changed hands and under the name of the New York, Chicago & St. Louis Railroad was built through from Buffalo to Chicago, giving them splendid facilities for passengers and the shipment of freight. To say that the long expectant people of this village were jubilant but tamely expressed the situation. A post office was established here in 1847 with William Mitchell, Postmaster.

For a town of less than two thousand inhabitants, McComb has as much of a metropolitan air and style as any other town of its size that the writer knows of. The main street is well paved with brick pavement, and the side streets are macadamized with stone, and all are kept in a cleanly condition. A number of permanent three-story buildings occupy the business portion of the town, and beautiful homes with well kept lawns adorn the residence portion.

In the line of business there are three good dry goods stores, three hardware stores, two drug stores, five groceries, one shoe store, one furniture store, two harness stores, two milliners, one feed store, two poultry and egg exchange and one hay shipper, one bakery, two meat markets, a hotel, a restaurant and a hotel. One state bank furnishes a place of deposit and exchange for the business men of this thriving place.

Religiously the people are provided with four churches—Methodist, Disciple, Presbyterian and Lutheran. For educational purposes they are provided with one room of common school and a high school of eight rooms, employing in all nine teachers. The industries consist of one tile mill, two lumber yards with mills, two grain elevators, one electric light plant, four blacksmith shops, Star water filter, Bell and home telephone, two livery barns, and other smaller shops.

The Odd Fellows were established here in 1859, and have a flourishing lodge, known as McComb Lodge No. 354. The Knights of Pythias, Woodmen of America, Maccabees and John Howard Post, G. A. R., are also represented. In professional lines, the following, named in the order in which their services are required: Five doctors, three ministers, one undertaker, and two attorneys. So that when the people of McComb are called to their fathers, in this, as well as in all things else, they are well prepared to meet the emergency.

The oldest man now living in the town is Abraham Rother, 87 years old, but the oldest continuous resident is Elisha Todd, 85, but he has been a resident constantly since 1833, a period of 76 years. Mr. Todd is a son of Benjamin Todd who laid out the town, and was a soldier in the 99th Regt., during the Civil War. Among the veterans of the late war might be mentioned Capt. Porter, son-in-law of George Algire, who entered the first land in the township, and Major Isaac Cusac, both formerly members of the 21st O. V. I.

MT. BLANCHARD.

In October, 1830, Asa M. Lake, one of the very earliest settlers of the county, laid out a town of fifty-three lots on a part of the west half of the northwest quarter of Section 1, and the east half of the northeast quarter of Section 2, and called it Mt. Blanchard. It is situated on the bluffs, on high ground on the east, or right hand bank of the Blanchard River. The location is a good one, surrounded by beautiful and rich farming lands. The town is regularly laid out in squares, the streets and alleys crossing at right angles. The buildings are mostly of wood, and the dwellings are commodious and comfortable. The town has beautifully shaded streets in the residence portion and the lawns in summer time are well kept, giving the village an air of comfort and grace not always found in towns of its size. The town was incorporated in 1865, and in this event it celebrated the closing of the Civil War. Dr. John Foster was the first mayor, since which time the following persons have held the office: H. C. Pickett, J. W. Turnpaugh, J. W.

Wingate, W. W. Hughs, A. F. Naus, Jacob Harris, R. W. McVary, Israel Bell, N. B. Clark, Isaac Snider, and at present, S. E. Lowe.

A postoffice was established here in 1834, with John P. Gordon as first postmaster, he being followed by Elijah Stradley, Chester Cook, W. W. Smith, J. Lafferty, J. Patterson, L. A. Baldwin, Henry Greer, C. H. Stewart, J. C. Treece, Jerome Smith, and the present officer, C. R. Burnett.

The Methodist Episcopal denomination built the first church in the town It was a frame building and built in 1838. The Rev. Thomas Thompson and Rev. Gavit, then missionaries at Upper Sandusky, were the first Methodist preachers. They organized a society at the residence of Father Greer, one half mile east of Mt. Blanchard, on the banks of Potato Creek where they continued to worship until a hewed log schoolhouse was built on a corner of the Greer land, in 1833 late in the fall, where they worshipped until they built their frame house in town in 1838, where they met for about twenty years, then moved in their present house, in the south part of town. At the present time there are two ornate and substantial church buildings in town, the Methodist Episcopal and the Methodist Protestant, both with thriving congregations and Sunday schools.

The first schoolhouse in the town was of the then prevailing style, built of round logs, with a huge fireplace, clapboard roof and other peculiarities not now known to builders. The Union School of Mt. Blanchard was organized in 1868, and a new house built and this was replaced by another building in 1873. This building contained three large schoolrooms beside smaller ones for recitation and other purposes. This building and grounds cost $8,000. In 1908 it was torn down and on the same grounds was built a fine light-colored, pressed brick structure of cement basement and four rooms on the second floor, which would be a credit to any village, town or even city, at a cost of over $15,000. It is furnished with an up-to-date heating plant and the most approved furniture. The Mt. Blanchard people are proud of their fine school building, as well they might be.

The village is located on the Northern Ohio Railroad, a division of the Lake Erie and Western R. R. and run under the management of the New York Central lines and at present has the right of way for an electric road extending from Findlay to Marion, Ohio, which, if completed as contemplated, will give them excellent passenger and shipping facilities to the outside world.

The town and surrounding country supports a lively little newspaper, "The Mt. Blanchard Journal," which keeps the inhabitants informed of both the local and foreign news, and is of incalculable value in a community of intelligent people. It is at present edited by Mr. L. E. Rumer, having lately changed hands.

The business of the village has always been quite extensive, considering that until recently the town has had no railroad or 'other means of transportation, and now that they have this advantage, it has increased many fold, the quality of the business houses being first class. There are two good general stores, two hardware and implement stores, two meat markets, two restaurants, two barber shops, two livery barns, and one each of grocery, drug store, milliner, hotel, shoe shop, harness shop, coal yard, saw- and planing-mill, grain elevator, stock yard, flouring mill, an extensive tile factory, wagon and carriage shop, undertaker, and People's Telephone Co., with an exchange of 327 phones. Professionally there are two ministers, two doctors and two lawyers.

There are thriving lodges of Free and Accepted Masons, Odd Fellows (owning their own hall), with Rebeccas, Knights of Pythias (owning their hall), and Grand Army of the Republic. For beauty of location, on an undulated plateau along the banks of the Blanchard River, in Delaware Township, and for the handsome appearance of its homes for a town of its size, Mt. Blanchard is hard to excel. Especial mention may be made of the palatial residence of Attorney John M. Hamlin, built by his father on his farm in the southern limit of the town, and now occupied by Mr. Hamlin, who is engaged in the practice of his profession in this pleasant village. Attorney Hamlin spent most of his eventful life in Findlay, where he practiced his profession and was otherwise extensively engaged in manufacturing.

Mr. W. S. Shoemaker, one of the leading merchants and farmers, carries on a private banking business, to the great convenience of the business interests of the town. Mrs. Shoemaker was the daughter of Doctor Foster, one of the pioneer physicians of Hancock County, and for many years the leading physician and surgeon in Mt. Blanchard. Doctor Aaron F. Burson was the first physician to locate here.

The population of the town is 525. Mt. Blanchard has one rural mail route.

MT. CORY.

This town is situated in Union Township, on the Lake Erie & Western Steam Railroad, and the Western Ohio Electric Railroad, three miles from Rawson, and twelve from Findlay, and was laid out in November, 1872, by Mathias Markley and Samuel Kemerer. It is located on a part of the west half of the southwest quarter of Section 22, and when laid out consisted of thirty-two lots. To these additions have since been made by Kemerer, Markley, John O. Smith and L. B. May. The lots were readily sold, and quite a number of buildings erected, and as the town is located in the midst of a rich agricultural district, the place has become one of some importance, and quite an extensive business is carried on. There are a number of neat and comfortable dwelling houses, mostly of wood, and several large and well arranged business houses, and a comfortable and commodious town hall.

There are two rooms for the common school and one for the high school, besides the township have voted the necessary bonds to build a township high school to cost, all told, twenty thousand dollars. The township business, and the business of the Union Township Mutual Insurance Company are transacted in Mt. Cory.

The Evangelical Association owns a good brick church and the Methodist Protestant Church have a fine frame building. A flourishing Sunday School is attached to each.

The business places are two dry goods stores, three groceries, one hardware, one tin store, one drug store, one restaurant, one barber shop, one meat market, two livery barns, one hotel, grain elevator and hay house, Ohio Oil Co. Supply Store, one blacksmith shop. In the professions they have one physician and three ministers, with David Comer, the veteran lawyer. They have a prosperous bank, a volunteer fire department with chemical and ladders; both the Bell and Mutual telephones have local exchanges here, there is one motor cycle mail route, while the Knights of Pythias and the Maccabees have flourishing lodges in the town. The Main Street and all roads coming into the town are piked, and fine shade trees adorn the streets.

A post office was established here in 1873, called Mt. Cory, with Benjamin Wildemuth as postmaster. Since then the office has been filled by Alfred Longbrake, W. J. Staater, J. L. Asire, Mathias Markley, David Comer, Jacob Zeller, A. C. Ewing, Sylvester Davis, and the present occupant, W. H. Falk. The population of the town is three hundred.

RAWSON.

The town of Rawson, in Union Township, on the Lake Erie & Western Railway, was laid out in 1855 by Fredrick Keller and J. G. Kelley, on the northwest corner of the southwest quarter of Section 13, and the northeast corner of the west half of the southeast quarter of Section 14, and originally comprised but fifty-four lots. The town was named in honor of L. Q. Rawson, of Fremont, Ohio, who was then president of the railroad. The town started out fairly, and soon quite a number of buildings were erected, but as the railroad, the locating of which had called the town into existence, was not built, and for years there seemed to be but little hopes that it would be, the town came to a halt, and was of little significance in the history of the township. A few mechanics had invested all their means in property in the prospective town, and could not sell it again. The town was one of the one dry goods and grocery store combined, with perhaps the proprietor holding the office of postmaster in order to hold his trade, with the addition of a blacksmith shop and wagon repair, and a saw-mill. For years it was a desperate struggle to keep life in the town—the same struggle that many other towns that make larger pretentions to cosmopolitan airs today have also passed through.

Finally in 1872 the sleepy little village was awakened from its seventeen years' slumber by the whistle of the first locomotive on the Lake Erie & Western Railroad, and business sprung into life, real estate changed hands, buildings were put up, stores were opened, the buzz of machinery was heard, and all was bustle, business and speculation, and streets were opened up to accommodate prospective trade. Of course the keen edge of a miniature boom wore off, and the inhabitants gradually settled down to every day life, but there was still quite an amount of business carried on, and the business of the town is still gradually increasing. Additional lots were laid out by Fred. Keller in 1859, by Jacob Burket in 1873, by C. J. Keller and Benj. Stringfeller in 1874.

Rawson was incorporated as a village in 1885, the first mayor being Geo. W. Burket, he being succeeded by the following named persons: S. A. Griffin, B. M. Allion, T. B. Gilbert, George Dean, Frank C. Shank, L. M. Osborn and Ed. W. Burket, the present incumbent.

A post office was established here in 1863, and named Rawson, with James C. Benham as postmaster. Since that time the office has been held by Jackson Miller, James Woods, Nicolas Watson, T. E. Woods, J. D. Buss, O. C. Cramer, C. W. Fox, B. M. Allion, W. D. Cramer, John H. Ellis and J. W. Baker, the present official. The Commercial Bank of Bluffton has established a branch bank here for the convenience of stock buyers, merchants and farmers, which is doing a thriving business.

The Rawson High School was first organized in 1892, W. N. Shank being the first teacher. In 1896 the course was revised by Prof. A. J. Nowlan, and two persons received their diplomas. In 1898, by the authority of the Board of Education, Prof. Nowlan wrote out a new course of study for the High School which was adopted, this being in existence until in 1902, when the course was changed and partly reorganized by Commissioner Bonebrake. In 1903 the courses were again strengthened by Superintendent Eby, and in December of that year the Elementary School Course was changed to eight years and the High School Course to four years.

In 1904 changes were again made by Superintendent Shilling, and Sept. 1, 1905, the first charter was issued by Commissioner E. A. Jones, recognizing the school as of the Third Grade.

At the opening of school in September, 1907, the course of study was again revised and other branches added. Also over 100 articles of physical apparatus and a compound microscope were purchased, the library was strengthened by the addition of over 100 volumes and an assistant to the High School was employed. This new course of study was referred by Superintendent Steiner in January, 1908, to Commissioner Jones, who on Feb. 5, 1908, issued a new charter for the High School recognizing it as of the Second Grade.

During the Summer of 1908 the fifth teacher for the school was employed as assistant principal, the schools being then in position to do much better work than they were able to do before these changes were made.

"The following years the school was again strengthened, a large supply of apparatus and a new encyclopedia and other books were purchased, and in the spring of 1910 a new course of study was adopted and a First Grade Charter received for the school, by Prof. Steiner."

Special efforts will also be made to strengthen the Normal work of the High School for those expecting to teach.

Instructors in the High School.—J. L. Steinner, superintendent and principal (Ohio Northern University, Goshen College); Literature, Science, History and Geometry, J. W. Shank, assistant (Goshen College); Latin, English, Algebra and part of Eighth Grade.

The Methodist Episcopal and United Brethren denominations have handsome modern houses of worship, and are supplied with able ministers in the persons of the Revs. Holmes and Smith. Rawson has a good brick, four-room schoolhouse, and employs five teachers in the public school. Both the Bell and Mutual telephones have exchanges in the town. Of societies, they have the Odd Fellows, Free and Accepted Masons, Knights of Pythias, Maccabees, Junior Order of American Mechanics and

Rebeccas. The business of the town is done by one general store, three groceries, one hardware and implement store, kept by the veteran merchant, J. D. Buss and Co., one furniture store, one meat market, two barber shops, one bakery, one grist-mill, one elevator and mill, one saw-mill, two livery barns, one blacksmith shop, a good stock-yard and an electrical sub-station. Professionally there are three physicians, two ministers, and one undertaker.

On September 6, 1887, a fire swept out the heart of the town, including most of the business rooms, but this district was soon built up with good and substantial brick buildings. And what at that time seemed a great disaster afterwards proved a blessing to the town. Rawson has a good system of sewerage, and its streets, and all the roads leading out of town are well piked. The sidewalks are of the best, and well shaded by beautiful maple trees. The population is estimated at about six hundred. Besides having the Lake Erie and Western Railroad, Rawson is an important station on the Western Ohio Electric road, running through cars from Toledo to Dayton, Ohio.

SHAWTOWN.

Shawtown was laid out by E. T. Cummins on the northeast part of the northwest quarter, and the north part of the west half of the northeast quarter of Section 30, Pleasant Township. The plat, embracing 74 inlots and 20 outlots, was acknowledged June 16, 1882, before Henry Brown, a notary public, and recorded October 16, 1882, by J. F. Gutzwiler, recorder.

VAN BUREN.

The town of Van Buren was laid out by George Ensminger and John Trout, in December, 1833, and is beautifully situated on a high and dry location in a bend of the middle branch of the Portage River, on parts of Sections 12 and 13, in Range 10, and Sections 7 and 18 in Range 11, and was originally composed of fifty-three lots. The town is laid out in the form of a cross, with an open square in the center, as is the order in many southern towns, and as is the style in Spanish towns where the open space is known as the "Plaza."

This space has been beautified during the last few years by rail fencing, sodding and the planting of shade trees, also a town pump occupies a place in this little park. Aside from the business houses and residences on this square, there are but two streets in the village, and they cross one another at right angles. There were quite a number of large and substantial buildings put up, and nearly all the lots on the public square were built upon, and for a time the place assumed considerable importance in trade, so much so as to be a serious competitor to Findlay. But as the country became settled up, and other towns sprang into existence that were fortunate enough to secure railroads, this place gradually lost its prestige, to the extent that one could scarcely buy a spool of thread here.

But the coming of the Toledo and Ohio Central steam railroad, and Toledo, Bowling Green and Southern electric road, gave new life to the drowsy little village. The streets were improved, new business blocks were put up and fine residences were erected and old ones newly painted. Now it is one of the pleasantest and busiest little towns in the county.

Van Buren was incorporated in June, 1866, upon the petition of thirty of its citizens. Daniel Frick was its first mayor, and was succeeded by C. S. Wilkinson, J. H. Loehr, Dr. E. C. Wells, Dr. Edward George, A. Mumert, L. P. McCune, Jacob Loehr, James Huntington, Conaway, James Grubb, N. H. McGauchey, D. H. Heistand, W. M. Bowersock, and O. Robbins.

A postoffice was established here as early, perhaps, as 1836, and the following persons have been postmasters: Dr. George Springer, John Zarbaugh, S. M. Heller, C. S. Wilkinson, L. Michaels, Dr. E. C. Wells, D. Frick, L. J. Hissong, Sol. Zarbaugh, H. C. Hartman, John Lee, Mrs. E. C. Wells, John Cramer, Chas. Roberts, E. C. Showman, Cal. Hanna, W. H. Bolton, G. S. Brushead and Geo. F. VanEmon.

The following comprises the business directory of the town: two general stores, one hardware store, one blacksmith shop, one barber shop and photographer combined, one shoe repair shop, one coal yard, one hotel, one livery barn, and one restaurant. Of schools they have one primary of one room and a fine brick school building of four rooms. Socially they have three churches, two resident ministers, two doctors, and Odd Fellows lodge, with Rebecca Sisters, Knights of Pythias and Pythian Sisters, Maccabees and Modern Woodmen of America. While there were but one hundred and thirty inhabitants here in 1880, there are now over four hundred.

VANLUE.

The town was laid out by William Vanlue, Esq., in whose honor it was named, and is on the northwest part of the northeast quarter, and the northeast part of the northwest quarter of Section 9. It is located in Amanda Township on the line of the Findlay Branch of the C. C. C. & St. L. Railroad, ten miles southeast of Findlay. The town was laid out in May, 1847, and at that time consisted of forty-four lots. In November of the same year the proprietor laid an addition of fifty lots. In October, 1853, S. N. Beach made an addition of fifty-seven lots, and in 1858, he, with others, laid out Beach's second addition of forty-nine lots. Charles Cross laid out an additional ten lots in 1870. From the sale of the first lots the town steadily improved, and was a very considerable grain market for a number of years after the completion of the railroad, but of no great importance otherwise.

There were many tasteful and comfortable dwellings, and the palatial residence of J. J. Harman, the hardware merchant, is an honor to any town, or even city. The streets have been improved by graveling and are shaded by thrifty trees, in all giving a home-like appearance as a residence village. After a few years of great prosperity, the town, as new towns often do, slacked up, and almost came to a standstill. Business seemed for a time to have forsaken the place. Enterprise too, seemed to have taken its leave. Progress had ceased and everything seemed to be "going to the dogs." But this state of affairs could not last long. The town could not stand still. It must go forward, or retreat, and it finally resumed its forward march.

In 1866, upon the petition of fifty of its inhabitants, the village was incorporated under the laws of the State. Pursuant to the Act of Incorporation, the first election for village officers was held on the 13th of April, 1867, with Peter Shuck, C. H. Hatch and Jason Lee as judges, and Ira Plotts and John Dresbach, clerks. There were thirty-nine votes cast. The following officers were elected: Mayor, Elisha Brown; councilmen, H. Pratt, Ira Plotts, B. A. Etherton, Charles Hatch, and A. S. Roberts; marshall, W. L. Plotts. The following persons have held the office of mayor: Elisha Brown, Aquilla Gilbert, Fred Shuler, J. H. Brown, B. F. Burnap, T. B. Gilbert, H. T. Lee, George Snooks, John Cross, L. C. Clark, Ira Plotts, H. G. Early, D. A. Eschbach, E. L. E. Mumma, Ralph E. Deihl, Charles H. Hatch, Harry A. Renshler, W. L. Daniels and D. D. Cole. George Snool is both the present mayor and postmaster.

But Vanlue has regained her former prestige in trade, and is at the present time a lively town. owing no doubt, largely, to the improved condition of the very productive farms surrounding it, for the great majority of the business done is with the farmers. All is in a flourishing condition, with good prospects for the future. The following is a list of the different business interests of the town: Two general stores, two groceries, one hardware store, one bakery, two hotels, one livery barn, two blacksmiths, one barber shop, one saw- and planing-mill, one grain elevator, two hay dealers with steam hay-balers, one coal yard, one bank, three churches with two resident preachers, two doctors and Odd Fellows and Knights of Pythias lodges in flourishing condition. The Odd Fellows are completing an addition to their property, which will give them one of the finest lodge rooms in the county, and the store will soon be occupied by J. J. Harmon as a hardware store.

The Vanlue Bank commenced business on April 24, 1909, and is doing a lively business, having already 138 regular patrons. The officers are President, W. J. Frey, vice-president, Chas. H. Bigelow, cashier, C. J. Oller; assistant cashier, H. J. Morehart. Its responsibility of shareholders to depositors is stated at over half a million.

A postoffice was established here in 1849, with Dr. W. P. Wilson as postmaster. The successive postmasters have been as follows: John Wescott, Ira Plotts, W. A. Sponsler, Daniel Gilbert, William Alspach, B. F. Burnap, Sherman Buckingham, Kib Burnap, Miss Rheba Burnap, Samuel LeMott, and the present incumbent, George Snook.

Owing to the great amount of farm products in the vicinity in the line of grain, hay and stock, there is much shipping done from this station on the railroad.

WEST INDEPENDENCE.

The proprietors of this town were George Wyant, Peter Wyant and Henry M. Grose. It is located in Big Lick Township, on the east part of the east half of the northeast quarter of Section 2, and at present has a population of about one hundred souls.

The United Brethren and Progressive Dunkards both have church buildings in the village, and there is a good, comfortable schoolhouse in the town.

The business of the place consists of one hotel, one grocery and provision store, one saw mill, one shoe repair shop and one blacksmith and wagon-repair shop.

A post office was established here in 1856, with Frederick Reamer as postmaster. Mr. Reamer was succeeded by J. L. Kenower, Jacob Ruth, William Blinn, John Wyancoop, Byron Leady, Westley Gibson, John Peters, White Lawhead, Jacob C. Hazen, A. J. Maurer, L. W. Gibson, J. L. Lenhart, and N. B. Hainer. The town has never been incorporated.

WILLIAMSTOWN.

This town situated in Madison Township, was named in honor of John W. Williams, the proprietor. It is located on a part of the northwest quarter of the northwest quarter of Section 31, and the northeast quarter of Section 36. It originally contained forty-eight lots, and as remarked by a resident, "It commenced small, and has held its own exceedingly well." At the time the town was laid out, there was no family within three miles of it. Mr. Williams opened a store and tavern in the place, and travel commenced along the range line, now the Bellefontaine State road. In about 1837, Christian Welty also opened a store, and a Doctor Smith located here for a short time, being the first in the township. He was succeeded by Dr. A. F. Burson, afterwards the first to locate in Mt. Blanchard, and who became quite famous for his success in the treatment of "Milk Sickness," then quite prevalent in this part of the county.

The town is located on the Toledo and Ohio Central Railroad fourteen miles directly south of Findlay and three miles north of the Hardin County line. The business of the place was never very great, and even the coming of the railroad did not increase it, but on the contrary, it has steadily declined, until at this time it has an appearance of forlorn lonesomeness. Arlington on one side, and the thriving town of Dunkirk on the other, have sapped its revenue, and investments here do not render an income. However, it still retains the usual blacksmith shop and convenient corner grocery.

A postoffice was established here in 1835 and Christian Welty was the first postmaster. The office was called Eagle until 1866, when it was changed to Williamstown.

STILL-BORN TOWNS OF HANCOCK COUNTY.

Capernicum, in Amanda Township, was laid out by Abraham Huff in March, 1831, on the west half of the northeast quarter of Section 3, and comprised sixteen lots. Aside from the fact that the town was laid out and recorded on a plat, the town has no farther record. The project was probably abandoned before any lots were sold. At least its history is less brief than that of the "city of the plain," after which it was named. It is exceedingly doubtful if any one at the present time is able to point out the site.

Frankford, in Cass Township. John Franks laid out the town of Frankford, on the northwest corner of Section 10. The town of seventy-two lots was regularly laid out, with a public square, or plaza, in the center. The prospective city, however, only existed in name, and no doubt would long since have been forgotten had it not been a matter of record. There were, perhaps, no lots sold, and the prospective town returned to its original state—that of wheat and corn fields.

Freedom, in Big Lick Township. On the 26th day of October, 1836, Uriah E. Drake laid out a town of forty-eight lots on the east half of the southwest quarter of Section 19, and named it Freedom. So far as can be learned this is the complete history of the place, as a town.

LaFayette, in Portage Township. Jacob Andrew laid out a town on the north part of the east half of the northeast quarter of Section 15, on land now owned by Daniel Warner, and called it LaFayette. It comprised seventy-two lots, and had great expectations. But here ends its uneventful history.

Louisville, in Blanchard Township. This

town was laid out in 1851, by William H. Powell, Daniel Millham and Michael Shearer. The town plat was in the northwest corner of the east half of the northwest quarter of Section 14, and the northeast corner of the west half of the northeast quarter of Section 14, and was composed of forty lots, but were never all sold, and no buildings were constructed on the plat. The principal streets were Defiance (Main Road), running east and west, and East, Lima and West streets, running north and south.

The town, however, after a sickly existence of a few years, was finally vacated, and remanded to the several owners. In its boom days, John Boylan kept a small general store in a small plank house where the staple articles of the market were kept in small quantities, but the trade not being profitable, he abandoned the business. The author taught school here in 1862, and at that time every vestige of a town had disappeared, except a tumble-down blacksmith shop and the district schoolhouse which was not much better. Beardsley in his history, 1881, poetically comments: "Such is the history of the birth, life and death and even decay of this town of 'great expectations,' and it does not now exist even in name, and scarcely in the memory of the neighborhood. How many hopes were blasted, and how many expectations came to naught in the early demise and decay of this pre-prospective city?"

Martinstown, in Eagle Township, was laid out on the southeast corner of Section 36, the entire corner of the township, by Martin Hollobaugh, in September, 1836. There were, perhaps, never any lots sold, or streets laid out, as the site was at the cross-roads, about one mile north of Arlington, and the records of the platting of the town closed up its existence, if indeed it ever had any.

Olney, in Pleasant Township. In April, 1857, Isaac Fairchilds laid out the town of Olney in Section 15, which comprised forty lots. The town never progressed farther than the platting, and it was only a town on paper, and its proposed site is now devoted to agricultural purposes.

North Ridgeville was laid out by Thomas Pickins on the east part of the northwest quarter, and the west part of the northeast quarter of Section 18, Pleasant Township. The plat, consisting of twenty-four lots, was acknowledged May 29, 1850, before B. Todd, justice of the peace, and recorded on the same day by P. Sours, recorder. The plat was vacated February 16, 1880.

Ridgeville was laid out by Lemuel Roberts on the northwest quarter of the northwest quarter of Section 2, Amanda Township. The plat, consisting of twenty-four lots, was acknowledged before W. L. Henderson, a justice of the peace, October 25, 1836, and recorded November 15, 1836, by Wilson Vance, recorder.

Silverwood was laid out by Addison J. and Nancy A. Silverwood and Anthony Huntington on the southwest part of the west half of the southwest quarter of Section 19, and the southeast part of the east half of the southeast quarter of Section 24, and the northeast part of the east half of the northeast quarter of Section 25. The plat, embracing fifty-eight lots, was acknowledged March 27, 1883, before Edwin Phifer, surveyor and recorder, April 9, 1883, by J. F. Gutzwiler, recorder.

West Union was laid out by Anson Sheller on the southeast corner of Section 26, Van Buren Township. The plat, consisting of forty-eight lots, was acknowledged before W. L. Henderson, justice of the peace, December 25, 1834, and recorded January 6, 1835, by W. Vance, recorder.

DISCONTINUED POST OFFICES.

Almost all of the townships have had post offices within their bounds at some time in the early part of the settlement of the county, but these have all been discontinued as the country grew older, and at the present time the post offices in the villages have their business greatly reduced by the system of rural delivery.

Perhaps one reason for establishing these country offices was that the roads were almost impassable during a part of the year, so that it was easier to have one person carry the mail out to these places, than that every farmer should be obliged to travel the well nigh impassable roads after it.

CHAPTER XX.

MANUFACTURING INDUSTRIES.

The Hancock Brick and Tile Co.—Buckeye Traction Ditcher Co.—U. S. Electric Porcelain Co. —Findlay Clay Pot Co.—Boss Manufacturing Co.—D. Kirk Sons & Co.—Findlay Table Manufacturing Co.—Hollerback Piano Co.—The H. H. Fassett Planing Mill—Tarbox and McCall—Findlay Casket Co.—Hayward & Young—Findlay Carriage Co.

The Hancock Brick & Tile Company is incorporated under the laws of the State of Ohio with a capital stock of $100,000 and has been in operation seven years, manufacturing brick, tile, hollow blocks and fireproofing. The officers of the company are as follows: President, James M. Esler; vice president, D. Earl Child; secretary, A. G. Fuller; treasurer, J. A. Gibson; manager, D. E. Child. The works are located in the southern suburb of the city on the line of the Toledo and Ohio Central Railroad and consist of a number of substantial brick buildings, nine kilns of 26 and 30 feet in diameter, ten tunnels of two hundred car capacity and 37,200 square feet of floor space for drying. The company employs sixty men, and besides what product is sold locally there is shipped annually from 550 to 750 car loads to outside points. The material for this large output is all near at hand, the company having about a mile of track to the clay fields, from which it is drawn in on small cars by horses, but arrangements are being made to use a light locomotive to do this work. There are five elevators in the works. They have three high pressure, water tube boilers of one hundred and twenty-five horse power each, and the most modern and approved machinery is installed in the plant. Seeing that nothing by way of material is imported except the coal, the profits of the plant are largely a clear gain to our town and county.

The Buckeye Traction Ditcher Company was incorporated under the laws of the state of Ohio, February 3, 1903, with a capital stock of $100,000. President, N. L. McLachlin; vice president, C. D. Haywood; secretary and treasurer, W. D. McCaughey; superintendent of construction, C. S. Brown. The works are located on the main line of the T. & O. C. Railroad, corner of Crystal Avenue. The main building is 100x300 feet; blacksmith shop and machine room, 80x160 feet; pattern room, 60x24 feet, and office 28x34; all constructed of cement block. Besides, they have ordered in addition a steel frame building 120x300 feet at a cost of $50,000 for building and equipments to meet the needs of the company's increasing trade. This building is to be finished by April 1, 1910. The number of men on the pay roll at this writing (Sept. 25, 1909), is 136, 127 of whom are voters, and the annual value of the output is $350,000. A large number of the Buckeye Ditchers are sold in the United States, Canada and Argentine Republic, but a goodly number have been sent to Europe and as many as five have been shipped to Australia.

The U. S. Electric Porcelain Co.'s works are located in the north part of the town on the T. & O. C. R. R. The company was incorporated in February, 1905, with a capital of $50,000. The officers are: President, F. W. Williams; vice president, C. H. Bigelow; secretary and treasurer, W. S. Bish. From 90 to 100 men find employment here at good wages and the capacity of the output is $100,000. All kinds of electrical porcelain are made here that find a ready sale in the market, it being an article of steady demand, and that demand is still in its infancy and will grow with the numerous and various uses of electricity coming into utility form day by day. The dimensions of this brick factory building is 120x400 feet. The plant has had a very steady run, missing only one day in thirteen months.

The Findlay Clay Pot Co. was organized during the gas boom in 1888, when there were over a dozen glass factories in the town, and although with the failing gas supply the factories sought new gas fields, yet from that day to this the Clay Pot Works has had a steady growth in the quantity and quality of its trade until now they send their wares to all points in the United States where glass is made. The company was incorporated under the Laws of Ohio in 1888, and the present officers are: President, C. H. Lambie; vice president and treasurer, J. M. Lambie; secretary, J. G. Quay. They own an extensive brick building of 320 feet and facing a spur of the C. H. & D. R. R., with a depth of 250 feet, employing 150 men, with the value of their output $150,000 a year, and are still making extensive improvements and additions to this plant, one of which is the installing of electrical power throughout. They manufacture clay pots of mammoth dimensions, thickness and weight out of a mixture of different clays, some brought from Missouri and some imported from Germany. These are combined in different proportions and from the large vessels in which the material composing glass is put and melted. The tank blocks are immense fire clay bricks, ranging in size from a foot square and 18 to 20 inches long, to 3 to 5 feet square and a foot thick, and weighing more than a half a ton, and are used to build large tanks used for the same purpose as the clay pots, in the making of window glass and bottles. In making the pot it is necessary that the clay should be mixed by tramping it with the bare feet, and no other process has been found available.

The Boss Manufacturing Company is incorporated under the laws of Illinois with a capital stock of $500,000. President, W. H. Lyman; vice president, H. T. Terry; secretary and treasurer, F. M. Lay; manager of the Findlay Plant, Wm. E. Houck.

The main plant is located at Kewanee, Ill., with seven others in different parts of the country. The Findlay plant employs 450 people with a pay roll of $9,000 a month and an output of 20,000 dozen pairs of gloves a week. The expense of running the plant is $9,000 a week. Not only gloves, but mittens and husking gloves are made here. The factory is located on Liberty Street with a track of the L. E. & W. R. R. running directly into it, giving great convenience of shipping. Their buildings are substantial brick structures, one 50x72, three story; one 50x100, three story; one 42x46, one story; and besides they occupy two rooms on Main Cross Street and are expecting to build more. They have storage enough for sixty car loads of products, and carry on hand over half a million yards of materials. All the machinery is propelled by electrical power, which is generated in the plant.

D. Kirk, Sons and Company, Wholesale Grocery. This firm was organized and incorporated under the laws of Ohio in 1899. In 1905 they built a fine pressed-brick building on east Sandusky Street, fifty feet front and one hundred and thirty feet deep with basement and four stories high. The track of the Big Four Railroad runs directly into the building, rendering the shipment of goods very convenient. The officers of the incorporation are: President, D. Kirk; vice president, M. Kirk; secretary and treasurer, Robert Kirk; manager, David Kirk, Jr.

The David Kirk Flouring Mill is located on the right bank of Eagle Creek on East Sandusky Street and is the oldest manufacturing plant in Hancock County. In 1845 John Julian and Martin Hershey bought the ground for one hundred and fifty dollars and built the structure that has remained to the present, a period of sixty-four years. In connection with the business of grinding wheat and corn there was a carding machine that carded wool into rolls for spinning on the domestic wheels before the days of machinery. This was in the days before the war. Later there was a planing mill set up in connection with the custom grinding, it being managed by D. C. Fisher. In 1846 Julian and Hershey sold the property to Benjamin Huber for $7,500, who ran the mill for nineteen years, when it was sold to Milton B. Patterson in 1865, for the consideration of $5,500. Mr. Patterson sold a fourth interest to E. M. Norwood for $1,300, and in 1867 the plant was sold to W. W. McConnell, who failed in business and the property was bid off at sheriff's sale by the present owner in 1879. For the last thirty years Mr. Kirk has run the mill very successfully, buying in grain, grinding it and shipping the product in connection with his custom work. The property is still in first class condition.

Findlay Table Manufacturing Company.—President, W. F. Hosler; secretary and treasurer, Lewis Hensner; manager, J. W. Andregg. This company are manufacturers of extension and library tables and began operation in 1886. On February 23, 1902, the entire plant was destroyed by fire, but was at once rebuilt and has been in successful operation ever since. They have a capacity for an output of $100,000 of products a year, when run to the full extent. About seventy-five men find employment here.

The Hollerback Piano Company.—President, L. Hollerback; vice president, W. H. Harlington; secretary, W. E. Houck; treasurer, Lynn S. Nicols.

This company are manufacturers of the Hollerbach pianos, and occupy a four-story brick building on Western Avenue near Lima Avenue, formerly the Lantern Works. The company was incorporated in February, 1909, and have a capacity when in full force of five pianos a day. About thirty men are employed here.

The H. H. Fassett Planing Mill, a substantial, brick structure on East Crawford Street, was built by H. H. Fassett and commenced operation in May 1905. On April 21, 1906, Mr. Fassett died and the business of the mill and lumber trade devolved upon Mrs. Fassett, who was very successful in the business until August 15, 1909, when in a severe electrical storm the building was struck by lightning and with the machinery and materials therein was reduced to almost a complete loss, without insurance. But the courageous Mrs. Bassett, with the assistance of her sons, who are still only lads, has commenced the re-construction of the plant.

Tarbox and McCall, engaged in the manufacture of crushed stone and cement building blocks are located on Western Avenue, where they have an output of 40,000 cubic yards of crushed stone a year. Part of this amount is used locally and part exported for the construction of stone pike. Two mammoth crushers are in use, one to crush the stones to road-making size, and one to crush them to a sand for plastering walls for which it makes a far better material than wash-sand, forming with lime a complete rock composition.

The Findlay Casket Company, an industry carried on at 343 Cherry Street, and run for sixteen years by Frank and Plotner, was organized and incorporated December 16, 1908, and the following officers were elected: President, Ray E. Fluckey; vice president, C. J. Pickens; secretary and treasurer, E. W. Funk. The company manufactures caskets and funeral supplies. They have a capacity of 100 a week, make the finest cloth covered caskets, selling to the local trade, and are successful competitors in the open markets against the best factories. A special feature of their trade is the making of the couch and davenport varieties of couch caskets.

Hayward & Young are proprietors of a planing mill, and deal also in coal. They are located on Crystal Avenue.

The Findlay Carriage Company. On lots 518-520-522 West St., Findley, Ohio, between Sandusky and Hardin Streets, in a building standing on leased ground, was begun the manufacturing establishment of O. J. Daugherty, about 1890, which never yet ceased growing and from about 1904 was known as the Findlay Carriage Company. In the beginning the company and Mr. Daugherty were one and the same; only a few new wagons were made, the greater part of the time being taken up in repairing vehicles of all kinds. In 1904 A. H. Moyer, who had been engaged in the manufacture and sale of buggies, carriages and wagons at Mt. Cory, Ohio, and had built up quite an enviable reputation for good work, sold out to his junior partner, moved to Findlay and joined in partnership with Mr. Dougherty, the latter being the woodworker and A. H. Moyer the blacksmith. These two gentlemen soon had a good trade, making and selling more than 150 vehicles annually, aside from the large repair trade they enjoyed. In August, 1906, J. D. Moyer, who had hitherto been engaged as teacher and superintendent of schools in Michola and Sedgwick, Kansas, was induced to join in the partnership, taking charge of the office, collections, etc., at the same time giving much attention to the sales department. This trinity partnership only continued till October of the same year, when A. H. and J. C. Moyer purchased Mr. Daugherty's interest and continued the business which had outgrown their building so much that in the fall of 1899 they were compelled to build a new addition two stories high, 30 by 75 feet, and add many improvements which enabled them to keep pace with their growing trade. Scarcely had they become settled in and accustomed to their new quarters and conditions when on Feb. 1, 1900, a disastrous fire destroyed the entire plant. Soon after, their present location—200-202-204-206 West Crawford Street—was purchased, which was then known as the old Table Works, and which was for some years idle. The front was torn down, the remainder improved and remodeled so as to be convenient for the business and the present splendid "Moyer Block" was erected at a considerable cost. In 1902 the Findlay Carriage Company engaged in the wholesale manufacture and sale of buggies, carriages and business wagons, and have continued the same since. They now have a reputation second to none for the production of high grade, well-finished, stylish work, which is shipped all over the north central states east of the Mississippi. In 1905 the Findlay Carriage Company was incorporated under the laws of Ohio with $50,000.00 capital stock, most of which was paid up, in which capacity the business has been conducted. John N. Doty, president; E. C. Taylor, vice-president; A. H. Moyer, treasurer and manager; J. C. Moyer, secretary. J. N. Doty, E. C. Taylor, A. H. Moyer, J. C. Moyer, C. G. Cook, J. T. Smith, A. E. Taylor are the Board of Directors.

The company now have engaged in the manufacture of automobiles in connection with carriages and buggies, and predict a bright future, as they have planned and designed a machine of the best style, mechanism and finish that cannot help but please.

CHAPTER XXI.

BANKS AND BANKING

Commercial Bank and Savings Co.—The American National Bank—The First National Bank—The City Banking Co.—The Buckeye National Bank.

The Commercial Bank & Savings Company located at Findlay, Ohio, was incorporated November 10, 1900, under the act of February, 1873, with an authorized capital of $80,000, and commenced business February 20, 1901, the incorporators being Messrs. John B. Heimhofer, W. A. B. Dalzell, Cloyd Marvin, E. C. Taylor, F. H. Griffith and Richard W. Boyd. As the name indicates, this bank was chartered by the State of Ohio to do both commercial and savings banking, and from its opening date has conducted both a commercial and savings business with far greater success than was anticipated by the most optimistic stockholders.

In view of the rapid and uninterrupted growth of business from the date of opening, and anticipating still greater expansion in, and volume of business the stockholders on March 4th, 1904, increased the authorized Capital Stock to $100,000, the increase being placed with some of the wealthiest men in the community, thereby increasing the number of stockholders to sixty; whose combined financial responsibility is conservatively estimated at Three Millions of Dollars.

The Commercial Bank & Savings Company occupies superbly equipped banking rooms in its building, a splendid example of the most modern type of individual bank building and an ornament to the architecture of the city, located at 335 South Main Street, being the only bank on the east side of said street. Thus it is assured of a central, convenient and permanent location on the city's main thoroughfare, where property is constantly increasing in value. From its opening date the institution has constantly enjoyed the confidence of the city's leading merchants, manufacturers and citizens generally, of whom a large number are among its depositors; in fact the management is of a character and the results shown are of a kind that commands the respect and confidence of all, and it is entirely safe to say that there is not a more popular bank in Findlay.

This bank was the pioneer in Saturday night opening and has continued the practice from its opening date with the satisfaction to its management of knowing that its efforts to please have been appreciated by the business public. The policy of this bank always has been and is to maintain at all times a strong cash reserve and invest its funds in municipal bonds, farm mortgages, and other securities easily convertable.

According to its report to the State Department of Banks and Banking under date of September 1st, 1909, the Commercial Bank & Savings Company had at that time resources amounting to $677,475.84, of which $149,559.76 was in the form of cash and due from other banks; $139,272.44 was represented by municipal and other bonds; its loans and investments amounted to $367,643.64, and its banking house furniture and fixtures $21,000.00.

Upon the side of liabilities the report shows a grand total of deposits amounting to $609,763.34.

The Capital Stock paid in amounting to $50,000.00 and surplus and profits reach $17,712.50.

The bank is a depository of the State of Ohio and City of Findlay.

The officers and directors of the bank are identified with some of the most important interests of the city. They are: E. C. Taylor, president; John B. Heimhofer, vice-president; C. J. Oller, cashier; and Chas. H. Bigelow, secretary and treasurer. The directors: E. C. Taylor, John B. Heimhofer, Peter J. Poole, W. J. Frey, N. W. Cunningham, Dr. N. L. MacLachlan and C. J. Oller.

The American National Bank.—Prominent among the financial institutions of Findlay is the American National Bank, which was organized in 1887, and has had an enviable record since then. One of the leading promoters of this bank was the late Judge Jacob F. Burket, who was its first president, and continued in that capacity until the time of his death in 1906. His good judgment and advice were of material assistance to the cashier and manager, Mr. L. W. Eoff, and are reflected in the unbroken record of prosperity and success that the institution has enjoyed since its organization.

The policy of the management has always been conservative and safe, and yet by tact and good judgment, a reputation for liberal treatment of the public has always been maintained. Accounts opened at the American National Bank are seldom changed as customers always get all the accommodations that they are reasonably entitled to. The general standing of the bank in Northern Ohio is very high and it is one of the strongest financial concerns in this section.

The Capital Stock of the bank is one hundred thousand dollars and total resources one million dollars. In addition to accumulating a substantial surplus fund, over one hundred and fifty thousand dollars of profits have been paid to the stockholders. The management of the bank is progressive, intelligent and careful, being safe at all times. A well equipped savings department is maintained, offering the facilities of a regular savings bank. The bank has a fine burglar and fire proof vault, and has safety deposit boxes to rent.

Drafts on all parts of the world are issued and steam-ship tickets and travelers cheques sold. The officers of the institution stand high in the business life of Findlay, and are as follows: President, Harlan F. Burket; Vice-President, C. L. Casterline; Cashier, L. W. Eoff; Assistant Cashier, A. E. Eoff. The officers with W. S. Parker and Reginald Burket, compose the Board of Directors.

The First National Bank.—Findlay is noted as a city of progress and safe institutions, but of all these none stand more high in the regard of the community at large throughout this section of Ohio than "the old bank"—the First National. No other bank in Northwestern Ohio, outside of the city of Toledo, has ever exceeded the million mark in total assets. This is a record with which no other financial institution in the city can compare.

The costly improvements recently made in the banking room and still in course of construction are a source of universal comment, and once again brings the bank to the fore as having the finest bank furniture of any bank in Northwestern Ohio, excepting one. This new furniture is complete throughout. It is of the most modern design, made of golden oak quarter-sawed and solid brass, together with plate glass and marble. The business transactions of the institution are transacted in what is really a very elaborate cage, there being a woven brass roof to the department of the cashier. An innovation in Findlay Banks, is a special room luxuriously appointed for the use of ladies separating them from the regular run of customers.

The First National was founded in June, 1863, with E. P. Jones as president; and Charles E. Niles cashier. The directors have been James A. Bope, Jacob F. Burket, R. B. Hurd, Henry Brown, H. P. Gage, James H. Wilson, George W. Kimmel, C. P. Jones, Anson Hurd, W. H. Wheeler, M. E. Jones, C. F. M. Niles, C. F. Jones, and James A. Blair, the latter now a millionaire banker in New York City.

Mr. Jones was formerly clerk in the post-office at Sandusky and later was appointed agent of the Mad River railroad in Findlay, a position which he filled for many years, and at the same time was engaged extensively in the grain business. He was a natural financier and his keen business ability brought him rapidly to the front.

Mr. Niles received his first banking education in 1852 in the State Bank of Ohio at Ashtabula, commencing at the ground floor at the foot of the ladder, he has worked his way up until he is considered one of the solid and level-headed bankers of Ohio. He has filled the positions of vice-president and president of the Ohio Bankers' Association and has held many responsible fiduciary offices during the past forty years.

Mr. E. P. Jones's death in 1894 caused the first change in the officers of the bank since it had been founded thirty years before. Mr. Niles succeeded to the presidency and George P. Jones, son of the bank's first president, became its cashier, a place that he has ably filled. Mr. Jones received his education primarily at Eastman's Business College, in Poughkeepsie, N. Y., but for over ten years before assuming the position of cashier he rubbed elbows with his father and Mr. Niles, two of the finest financiers in Ohio, and from them gained an invaluable knowledge of the banking business. Both Mr. Niles and Mr. Jones continue in active service in the bank, none of the employes of the institution putting in more arduous hours then they.

The first furniture was that just recently succeeded by the handsome new equipment. It was of massive black walnut and plate glass and was one of the sights of the town for many years.

The bank is just beginning the third period of its long career. From 1863 to 1892, the first period, the bank issued no higher than $5 bills; in the second period, to 1902, $5, $10 and $20 were issued; and now the bank is issuing its banknotes for $50 and $100. One of the interesting relics of the institution is the old ledger, with which business was first opened in 1863. The capital stock of this bank, paid up, is $150,000; surplus and undivided profits, $31,100; and individual deposits $874,500.

The same course that has been pursued for forty years is still the guiding star of the bank and it is bearing it ever upward and onward. The First National is always safe, always conservative and is the largest and strongest bank, not only in Findlay but, with the single exception of Toledo, in all this part of Ohio.

The City Banking Company was incorporated November 6, 1897, and commenced business, December 4, 1897. It succeeded to the business of the City Bank of Findlay, a private bank organized by Peter Hosler and associates on May 1, 1887, which bank has held an honorable position in the financial affairs of Findlay during the entire term of its existence. Mr. N. M. Adams, the president (also treasurer of the Adams Bros. Company), is a man of large experience in business and is thoroughly in touch with the business world. Mr. D. H. Heistand, vice-president, is a man of large means, a successful oil producer and a progressive business man. W. F. Hosler, the cashier, has been identified with the banking interests of Findlay for the past twenty years and by diligence, prudence and square dealing has built up an enviable reputation. The paid-up capital stock of this bank is $55,000 and the individual deposits amount to $468,000.

The Buckeye National Bank.—The Farmers' National Bank of Findlay, Ohio, was organized under charter No. 3477 bearing date of March 30, 1886. This bank was merged into the Buckeye National Bank in January, 1904, since which time its growth has been most gratifying to its patrons, stockholders, and officers; its deposits have increased from $424,000.00 in 1904, to over $1,250,000.00 in January, 1909, making a gain of over $150,000.00 per year. The officers of the Buckeye National Bank feel more than grateful to their many friends for this magnificent growth. The Buckeye National Bank stands for solidity, soundness, and strength over Hancock County and all Northwestern Ohio. It is the leading monetary institution of Hancock County, and one of the strongest banks in the State.

The resources and strength of the Buckeye National Bank lie directly or indirectly in the holdings of its several stockholders, their possessions in reality amounting to many thousand acres of valuable lands. They are the controlling spirit in different national and private banks; this bank has the proud distinction of having two millionaires numbered among its stockholders. Few banks in Ohio can say as much. Many of our leading merchants, farmers, manufacturers and business men use this bank as their bank; its officers and directors keep in close touch with current financial issues, always holding a conservative hand on booms and movements speculative in their tendency. The Savings Department is fully equipped and up-to-date in every particular, a place where every man, woman and child in Hancock County is cordially invited to deposit their savings with confidence and security.

The bank has fitted two rooms in the rear for the private use of its patrons where all are made welcome and everybody invited to take his friend or friends for private business or consultation, where stationery is found upon its desk and everybody invited to help themselves. The officers at the present writing are: W. W. Edwards, president; David T. Davis, vice-president; W. J. Creighton, chairman of board; Ralph W. Moore, cashier; C. W. Shireman, assistant cashier; J. C. Spencer, assistant cashier; F. P. Blackford, A. L. Stephenson and P. W. Ewing, directors.

The Farmers' Bank Co., of Jenera, Ohio, is a flourishing financial concern which takes worthy rank among the banks of Hancock County. Its capital stock is $25,000.00 and its present officers are John J. Von Stein, president; J. L. Higbie, vice-president; A. H. Good, cashier. Directors—Jacob Von Stein, Adam Von Stein, Adam J. Gossman, John Heldman, John Von Stein, A. H. Good and Dr. J. L. Higbie. The following was the bank's statement for June 30, 1910:

RESOURCES.

Loans and Discounts	$ 79,787.81
Over Drafts	73.80
Bonds and Securities	
Furniture and Fixtures	2,512.90
Real Estate	9,493.42
Nat. Bank of Commerce	12,846.95
Toledo	
New York	
Cleveland	
Cash	4,533.33
Total	$109,248.21

LIABILITIES.

Capital Paid	$ 15,000.00
Undivided Profits	2,115.86
Deposits Subject to Check	30,005.29
Demand Cert. Dept	2,876.92
Time Cert. Dept	54,250.14
Due to Banks	5,000.00
Total	$109,248.21

CHAPTER XXII.

RECAPITULATION AND STATISTICS

Comparison of Early and Present Conditions—Road Building—Sewerage—Timber—Land Values—Agricultural Prosperity—Public Buildings—Water Supply—Manufacturing Industries—Some First Things—Roster of Public Officials.

The author came to Hancock County in 1851, then a boy of seven years of age, and remembers well the conditions of the county. Outside of the towns, there were at that time perhaps not a half dozen frame houses, the then prevailing style of architecture being either round or hewed-log dwellings, those dwelling in the latter being considered the aristocracy. Even in these best houses there were no carpets, except now and then perchance one made of rags with a homespun chain in the weaving; and such a thing as a piano or organ would have been considered an unwonted extravagance and would have given occasion for the gossips to exercise their jealousy.

Not a mile of improved road then existed in the county, not even in the town of Findlay, and it was no uncommon event to see one or two yoke of oxen, hitched to a wagon with a moderate load become stalled in the mud of Findlay, Main Street; while to drive in the county at night was a difficult task, owing to logs and stumps obstructing the right of way. And where the way passed over low ground, corduroy was built up, by placing large logs side by side, filling the depressions with smaller logs, then a covering of brush, on which earth was placed, to be washed off by the first rain; sometimes the waters arose and floated out the whole structure. Sometimes these structures were curved to avoid great stumps that were too colossal to be removed, until time caused them to decay. This was in the time before any ditching or tiling had improved the drainage, and during rainy spells the roads were almost impassable at any time of the year.

The virgin soil being rich, made very poor material for public highways, but afforded good crops, where the natural drainage was sufficient to carry off the surplus water.

In 1852 or '53, the town council passed an ordinance that all property owners on Main Street, Findlay, should improve the street to the extent of the width of his lot and to the center of the street, by placing hereon a depth of six inches of broken stone. No contract was to be given to any one party to do this work, but each individual property owner between the river bridge and Sandusky Street had charge of his share of the improvement and did it at his own convenience, giving the street the appearance of an unfinished patch-quilt. Owing to the looseness of the ground foundation and to the fact that great quantities of mud were deposited upon it from the wheels of the wagons coming out of the country roads, this McAdam road that had been the joy and pride of the village, disappeared from view and is poetically "though lost to sight, to memory dear."

However, the people gave no sign of discouragement, but placed another layer of stone on that street from time to time, and when it became covered with mud raked it up with hoes and hauled it off, redressing it with broken stones. This was kept up until 1890 when the whole mass was removed and replaced by a twelve-inch foundation of crushed stone, and paved with paving brick from Lima Street on the south to Howard Street on the north, together with Allen Avenue, which was the first side street paved. This was followed in 1902 by the paving of Main from Lima to Third Street, East Sandusky Street, Center and Cherry and from year to year more paving was completed until now the entire town is done, and Findlay has fifteen miles of brick pavement and one "Hurd Avenue" of asphalt paving.

Commencing along in the early seventies, there was an effort to pike the county roads, but this met with bitter opposition from the farmers and at an election for the purpose of levying a tax to improve the county roads it was badly beaten. Two years after, and after it was thought the farmers would take part, another election was held, but the measure was again defeated, but with a less majority against it, a number of the more progressive farmers voting in its favor.

Then Findlay Township took up the matter and by special legislation bill voted three mills on the dollar valuation to build roads. The roads that were built with the money—poor though they were—convinced the farming community that what they did need most was good roads, and instead of opposing, they began clamoring for them, importuning the county commissioners to increase the levy for pike to the limit, and most of the townships followed Findlay's plan of voting a levy to improve the roads within their townships until at the present date, 1909, all of the main roads and a goodly part of the side roads are improved by piking with crushed stone, rendering them passable for business or pleasure the entire year. And still the cry goes up from county and town, "Give us better and more good roads."

The work of open ditching and underdraining has been referred to in the part of this work devoted to the farming interests and will not be extensively mentioned here, except to say that in the fifties much of the best soil was useless on account of the want of artificial drainage, while now this is the best soil for agriculture, having been drained of its surplus water, and the writer believes there is not an acre of land in Hancock County, that cannot be tilled.

The matter of sewers for the town was first taken up about 1868 by an ordinance to construct two-tile sewers in Findlay, one on each side of South Main Street from the river to Lima Street. This measure met with no little opposition from the uninformed, and the writer remembers right well, of the wealthiest personage, Judge Cory, who lived on the west side of Main Street between Front Street and the river, complaining of the sewers, because as he said he had a good well seven feet deep, and by sinking the sewers to the same depth, it drained his well and consequently rendered it useless.

These old sewers are still used locally and are of some convenience, but the city of Findlay has an excellent sewer system, serving all parts of the town with an outlet into Blanchard River below the town through a six-foot brick-shell sewer, and not only Findlay, but all the smaller towns of the county are well provided with sewerage. Owing to this work of ditching, sewering and tiling more than to any other thing, the sickness and especially the acute diseases of the people have decreased at least fifty per cent.

Mention has been made of the immense quantities of valuable timber growing in Hancock County, in an early day, and it has been estimated that if the timber were now as it was one hundred years ago it would be worth as much as the improvements are today.

Along in the fifties when the people began to build frame barns and houses and the railroad was built to Cory and gave us shipping to water at Sandusky, the saw-mill business was given a great impetus, and the best part of this fine timber was cut into lumber either for domestic use or exported. This work gave employment to a great many men for thirty years, but now the saw mill industry is almost a thing of the past, and the quality of timber now used by the mills would not have been recognized as eligible in those days.

Very little of the original forest remains in the county, yet each farm has a lot of from five to thirty acres of woodland, mostly second growth, and some of the more enterprising farmers are planting and cultivating quick-growth trees. Among the most valuable timber was great quantities of black-walnut. Many farms were fenced with rails split out of this growth and the rails are in a good state of preservation to this day. During the Civil War, government contracts brought up a great part of the walnut with which to make gun stocks and many thousand were cut out in the rough in Findlay.

In the early part of 1850-60 land in Hancock County was at a low price. Good farms, half of which were cleared, could be bought for from ten to fifteen dollars an acre, much less than it would cost nowadays to hire it cleared up and fenced. The price advanced slowly as the settlers emerged from the poverty of pioneer life and during the war arose, or seemingly so, to a high figure, as high as $75 to $100 an acre, but as greenbacks—the war money issued by the government—were only worth about forty cents on the gold value, this price was fallacious, being in fact equal to about forty dollars per acre. Still land kept on steadily advancing in price, excepting during some panicky years, until now the farms of Hancock County are selling from ninety to one hundred and fifty dollars per acre. This has been largely brought about by the high price of farm products, especially corn, and the improved manner of farming. During the early days referred to, most of the farms had a mortgage on them, but these have been lifted and at the present time it is a rare thing to find a farm on which this encumbrance exists and is only found on some recently purchased tract. The farmer today is the prince of the realm. His residence is beautiful and commodious and his barns capacious, giving shelter to his stock and storage to his crops. The production of his acres has been largely increased and his stock has been bred up to one hundred per cent over the former conditions.

As previously stated, the county is well supplied with schoolhouses and churches, and this with good roads, rural delivery of mail and a number of interurban railroads, life in the country is rendered agreeable and convenient.

As to Findlay, the county seat, located near the center of this productive county, it could be nothing less than prosperous, having a fine court house, jail, and sheriff's residence, a stone municipal building 50x200 feet and a full complement of schoolhouses and churches, with an elegant high school building.

The new court house had its inception in June, 1837, when the county commissioners advertised in the Findlay Courier that proposals would be received on the 4th of July following, at the auditor's office in Findlay to make two thousand good brick to build county buildings in Findlay and that a draft or model shall be drawn of the court house suitable for the county at the expense of the county.

With respect to the erection of this court house the records are incomplete, but it has been ascertained that John McCurdy was the builder and that the court house was probably begun in the latter part of 1837 and that it was completed in 1842, costing $7,953.22.

This structure answered its purpose for over forty years, at the end of which time the growth of the county and the consequent increase of business in the various offices demanded a larger and more substantial edifice. Accordingly, on April 17, 1885, the legislature of the state of Ohio passed an act authorizing the building of a court house in Findlay, Hancock county, Ohio, and the issuance of bonds to meet the payment of the same. On June 5, 1885, the committee, consisting of C. S. Kelley, J. M. Moorhead and A. S. Beck, commissioners of Hancock County; G. S. Galloway, appointed by the court of Common Pleas, together with G. W. Myers, probate judge; Lemuel McManness, sheriff, and Pressly E. Hay, clerk of the courts, met to make preliminary arrangements and consider the plans of the newly contemplated seat of justice.

August 11, 1886, the corner-stone of the new court house was laid amid appropriate ceremonies and a grand celebration consisting of speeches, music, parades and accompanied in the evening with a grand display of gas illuminations. The work of construction was pushed along as fast as possible and on October 27th, 1888, the building was dedicated to the use of the public.

The architecture of the building in the main is classic, though the roof is pitched, the inconvenience of a flat roof being thus avoided. The outside finish is entirely of stone, with rock face work and cut-stone trimmings. The front windows are large and showy, the smallest having a five-foot opening and the largest one of seven feet. Each window has forty-four square feet of plate glass or more and ample light is furnished in every part of the building. No wood whatever, excepting window-frames, doors and a portion of the floors, is used in the construction of the edifice, which is guaranteed fire-proof. The tower is 130 feet high from the ground to top and 107 feet to the center of the clock dial. It is finished with a dome roof surmounted with a statue of John Hancock sixteen feet high. The tower is built entirely of iron and stone and is 24 feet square. The clock dial is 9 feet in diameter and can be illuminated with gas or electric lights. The edifice is 142 feet long and 82 feet wide, and 146 feet from ground to top. Entrance into the first floor hall from the front on the east is through a stone portico supported by four polished granite columns 20 inches in diameter. This portico is designed as a protection for the first flight of steps so often left uncovered.

The portico, 12 feet high, is sumounted by an imposing entablature extending up to the roof. In this is a magnificent stained glass window 12 x 26 feet in size opening out upon the balcony, having an archway top and extending through two stories. This arch is surmounted with a group of feminine figures repsenting Justice, Law, and Mercy. Two small easy flights of stairs separated by a vestibule, lead through double doors into a spacious hallway running through the building, intercepted by a traverse hallway 18 feet wide and 75 feet long.

In the center is an octagon rotunda 20 feet square with a gallery up through and into the dome. It is furnished with tile floors and iron ceilings, and the walls are of fine pressed and enamelled brick. To the right of the hall near the entrance a door opens into the treasurer's office for the reception of city taxes and an archway from that leads into the main office of the same official, where taxes in general are received. Three places of entrance are provided and the room is 24 x 28 feet in dimensions. To the north and adjoining the general collecting room is the treasurers' money vault and private office, the private office being 13 x 15 feet in dimensions. This is about the size of all the private offices.

Immediately adjoining this office to the west is the auditor's offices consisting of three rooms. The main office is 30 x 35 feet in size and has communication with the treasurer's office by means of a sliding window. Besides the private office and workroom adjoining, there is a large fire-proof record vault 13 x 28 feet in dimensions and containing a window. To the south of and adjoining the auditor's vault and office is the commissioners room 17 x 24 feet.

On the left side at the front entrance is the sheriff's office, 16 x 18 feet in size. This is connected with the common pleas court room on the second floor by means of a private stairway.

At the south entrance of the traverse hall is the entrance to the probate court room, 24 x 30 feet in dimensions, which, like the auditor's office, is separated from the hall by a stained glass screen. Adjoining on the east side is the probate judge's office, while to the north of the office is the record vault. To the west of the probate court room is the retiring room for the witnesses, which is also used as a private office. The southwest portion of the first room is used by the recorder, who has a private office to the south and a record vault to the north of the main office.

The second floor may be reached by a large double iron staircase at the rear of the main hall. It has midway landings and a large stained glass window looks out in the rear. In the southwest portion of the room away from the din and noise of the streets is the common pleas court room 35 x 40 feet in dimensions. It is furnished with amphitheatre tiers of seats and the general public may gain entrance through large double doors. Back of the bar railings are several private entrances for officials and those having business with the court, so that they need not push their way through the crowds in the court room. The judge's bench is in an archway in the partition dividing the court from the judge's room and a room for the law library and for attorneys' consultation with clients.

On this floor also is conveniently located apartments for grand and petit juries and waiting witnesses. The clerk's desk in the court room is connected directly with the clerk's suite of three offices in the front part of the second floor. In the northeast corner the prosecuting attorney has a good-sized office and convenient consultation rooms.

To the west of this office and at the north end of the traverse hall there is an office for the county school examiners.

In the northwest corner a room of ample size has been set apart as a circuit court room, and immediatel adyjoining this on the south is a large room for the circuit judges.

The basement has a spacious assembly hall for conventions and public gatherings. Besides this there is the surveyors' office, a public library room, reading room and janitor's boiler and work rooms most conveniently arranged. It will thus be seen that the county now has a public building adequate to all the purposes for which it was designed and there is no reason to doubt but that it will continue to meet the public wants for many years to come.

Formerly the city water supply was obtained from the Blanchard River, but the development of oil along this stream above the town contaminated the supply and forced the city to obtain its water from magnetic springs at Limestone Ridge ten miles above them, and this supply is pronounced the purest water supply of any town or city in the state. The water is conducted directly from the springs by conduits to the pumping station, and is not exposed to the light of day until drawn from the faucet. The supply is abundant and has shown no signs of exhaustion in the dryest seasons, it being used for all the purposes of the town. Since its introduction sickness has greatly decreased; cases of typhoid fever are quite rare, and no epidemics of any kind have struck the town since its use commenced five years ago. The city is the owner of the plant, and although largely in debt for it, it is on a good paying basis and the income is steadily increasing.

Findlay has no large factories but quite a number of small ones, and the workmen are not foreigners but our own citizens, most of whom own their own homes and are prosperous.

Aside from those given special notice are the Adams Machine Shops, manufacturing and repairing oil well machinery, making steam boilers, and bridge building; the National Oil Refinery, for the manufacturing of crude petroleum into its various products; the Chamberlin Cartridge and Target Works for the making of clay targets for trap shooting; the National Handle Works, Findlay Basket Factory, and other small industries. Several of those last mentioned are under the control of trusts who do not allow the managers to give out a single word relating to the business or output.

And now, after having traced the story and facts of this county of Hancock in the State of Ohio of America, from and even before its conception to the present time—from the time when land sold for one dollar an acre to the time when the same land sold for upwards of one hundred dollars an acre, and when lots sold in Findlay for ten dollars that are now worth ten thousand dollars; from the time when very little, if anything, was exported, and less if possible, was imported, to the time when thousands of car loads of the products of the fertile soil, are exported and an abundance of the necessaries and comforts of life are imported; from the time when the inhabitants depended entirely for their living support upon their own products to the time when all depend largely for their wants upon the productions of some one else—I bring this history to a conclusion.

Time has rolled on until there is scarcely one of the pioneers of 1830 to '35 remaining to relate the "short and simple annals of the poor"; yet we owe it to ourselves and to posterity not only to preserve the records of their work in the past, but also the record of the present status of Hancock County, and in keeping with this thought I will close this final chapter with a statement of "First Things" followed by a Statistical Statement of the present standing of the county as furnished by our present genial auditor, Fred C. Shank.

SOME FIRST THINGS.

The first fair was held October 15th, 1852.

The first murder of record occurred in 1846. John Parish supposed to have been murdered by one B. F. Dulin.

The first gas and oil well of importance was struck November 5th, 1884, on the Oesterlin farm, east of Findlay.

The first assessor was Dan Alonzo Hamlin, 1828.

The first deed was one granted June 3rd, 1822, to John Gardner, being the W. pt. S. E. ¼ Sec. 13 T. 1 N. R. 10 East.

The first mortgage was executed February 8th, 1840, given to Isaac Jones by Jos. Remington, on the S. E. ¼ N. W. ¼ Sec. 1 T. 1. N. R. 11 E.

The first election was held on the first Monday of April, 1828.

The first case in court was Robert Elder vs. Asa Lake et al, April 17th, 1829.

The first will was made by John Wolford, June 26, 1829, and probated April 30, 1830.

The first administrator was William Taylor, administrator of the John Patterson estate, March 19, 1829.

The first physician was Dr. Bass Rawson, who came in September, 1829.

The first lawyer was Edson Goit, in August, 1832.

The first bank—The First National, 1863.

The first death of resident was that of Mrs. Matthew Reighley, 1822.

The first mail carrier was Joseph Gordon.

The first mail route was established in 1820.

The first lodge was the I. O. O. F., established in 1848.

The first minister of the Gospel was the Rev. James Gilruth, in 1822.

The first newspaper was The Findlay Courier, Nov. 10, 1836.

The first street railroad was opened on Main Street in 1887.

The first telephone line was established in 1879.

The telegraph line was established in 1862.

The first settlement in Hancock County was made in 1815 by Benj. Cox.

The first white person born was Lydia Cox, in 1815.

The first entry of land was made by Joseph Vance, William Mill and Elnathan Cory, on the third of July, 1821, being the S. pt. S. W. ¼ and S. E. ¼ Sec. 8 and E.

pt. S. E. ¼ Sec. 13 and N. E. pt. N. E. ¾ Sec. 17 T. 1 N. R. 10 East.

The first church was built 1822, known as the Duke's Meeting House, west of Findlay.

The first schoolhouse was in Findlay.

The first teacher was Joseph White.

The first marriage was performed Sept. 2, 1824, by W. Vance, justice of the peace and the participating parties being Samuel Kepler and Rachel McKinnis.

The first divorce was granted Aug. 17, 1846, to Benj. and Elizabeth Tremain.

The first court was held March 14, 1828.

The first court house was ordered built Jan. 16, 1832.

The first jail ordered built July 3, 1830.

The first bridge was built across the Blanchard River at Findlay in 1843.

The first railroad was built in 1849 from Findlay to Carey.

The first county road was located from Findlay to Vanlue, ordered Sept. 16, 1829.

FIRST SCHOOLHOUSES.

Name of Township.	Date.
Allen	1836
Amanda	1831
Biglick	1836
Blanchard	1833
Cass	1836
Delaware	1830
Eagle	1834
Findlay	1827
Jackson	1832
Liberty	1832
Madison	1833
Marion	1836
Orange	1837
Pleasant	1838
Union	1838
Portage	1837
Van Buren	1842
Washington	1833

FIRST CHURCHES.

Presbyterian	1843
German Lutheran	1831
Methodist	1837
Methodist	1836
Methodist	1844
Methodist	1834
Evangelical	1835
Methodist	1838
Methodist	1838
Methodist	1851
Methodist	1858
Baptist	1836
Plainfield Society of the Seceder	1836
Methodist	1850
United Brethren	1848
Baptist	1836
The Advents	1854
Methodist	1835

FIRST SETTLERS.

Township.	Name.	Description.	Date.
Allen	Nathan Frakes	W. ½ N. E. ¼ Sec. 13	1827
Amanda	Thomas Thompson	E. ½ N. W. ¼ Sec. 3	1822
Biglick	Henry McWhorter	W. ½ S. E. ¼ Sec. 3	1823
Blanchard	John Hunter and Benj. Chandler	S. W. ¼ Sec 16	1823
Cass	David P. Day	N. W. ¼ Sec. 11	1821
Delaware	Asa Lake	W. ½ N. E. ¼ Sec. 1	1821
Eagle	Adam Woodruff and John Woodruff	W. ½ S. W. ¼ Sec. 25 and S. E. ¼ Sec. 26 and N. E. ¼ Sec 26. W. ½ N. W. ¼ Sec. 25	1829

Findlay	Benj. Cox	Opp. Ft. Findlay & W. ½ N. E. ¼ Sec.	1815
Jackson	Mordecai Hannond	W. ½ S. E. ¼ Sec. 35	1827
Liberty	Rob. McKinnis and Chas. McKinnis	E. Pt. N. W. ¼ Sec. 7	1822
Madison	Simeon Ransbottom	W. Pt. S. W. ¼ Sec. 7	1822
Marion	Jos. A. Sargeant	N. ½ W. ½ S. W. ¼ Sec. 11	1825
Orange	Henry L. Dally	E. ½ N. W. ¼ Sec. 21	1827
Pleasant	Edw. Stephenson	S. E. ¼ Sec. 19	1834
Portage	John Thompson	W. ½ N. E. ¼ Sec. 27	1833
Union	Philip Cramer	W. ½ N. W. ¼ Sec. 27	1833
Van Buren	Benj. Sparr, Charles O.	E. ½ & E. ½ N. W. ¼ Sec. 1	1831
	Bradford, Charles Herron and George Hart	N. W. ¼ Sec. 27	1831
Washington	John Gorsuch	N. E. ¼ Sec. 1	1831

ROSTER OF COUNTY OFFICIALS.

Note—Except in a few instances, the name of an official who served two or more terms is not repeated.

COMMISSIONERS.

Name.	Commencement of Term.
Godfrey Wolford	1828
John Long	1828
John P. Hambleton	1828
Charles McKinnis	1828
Mordecai Hammond	1829
Robert L. Strother	1831
John Rose	1832
John Byal	1833
John L. Carson	1834
William Taylor	1835
Darius Smith	1835
Aquilla Gilbert	1837
Daniel Fairchild	1838
George Shaw	1839
Andrew Ricketts	1841
Peter George	1843
John Lafferty	1844
William Taylor	1845
William W. Hughes	1847
Thomas Kelly	1848
Elias Cole	1849
Jacob Bushong	1853
William Davis	1854
John McKinley	1855
John Graham	1857
Isaac Cusac	1859
Conrad Line	1861
Jacob Bushong	1862
John Cooper	1862
William Taylor	1863
David W. Engle	1864
William M. Marshall	1868
Samuel Creighton	1869
Joseph Saltzman	1871
John D. Bishop	1872
John Edgington	1874
Ross W. Moore	1876
Lewis Luneack	1878
Bateman B. Powell	1880
Charles S. Kelly	1882
John M. Moorehead	1883
Isaac M. Watkins	1886
George W. Krout	1887
Jacob Pepple	1889
Christian Garber	1891
Henry B. Rader	1893
Benjamin F. Wineland	1895
John A. Anderson	1896
Jacob R. Tussing	1897
Israel W. George	1900
Isaac Hart	1901
Abraham J. Overholt	1902
J. W. Montgomery	1906
J. C. Greer	1907
Jefferson Roller	1909
Lewis W. Brickman	1909

SCHOOL EXAMINERS.

William Taylor	1828
William Hackney	1828

Mordecai Hammond	1828
William L. Henderson	1830
Bass Rawson	1830
Thomas F. Johnston	1830
Robert L. Strother	1830
James Taylor	1833
Philip Cole	1833
Aquilla Gilbert	1833
David Patton	1838
Daniel Woodward	1838
Arnold F. Merriam	1838
Jacob Barnd	1839
Charles W. O'Neal	1839
George Van Eman	1839
Charles W. O'Neal	1841
William Taylor	1841
William H. Baldwin	1842
Erastus Thompson	1843
Charles W. O'Neal	1844
Jacob Barnd	1843
Machias C. Whiteley	1845
William Mungen	1845
Aaron H. Bigelow	1845
William Thomas	1846
John H. Reid	1849
Henry Brown	1849
Aaron Blackford	1849
John Bowman	1850
Alonzo L. Kimber	1850
Henry K. Leonard	1853
Henry H. Alban	1851
John Morris	1853
Wesley Quibley	1854
Alonzo L. Kimber	1855
James B. Hall	1855
John F. Caples	1855
John Bowman	1856
John Morris	1857
James Seed	1858
Ephraim Miller	1859
Lewis Tussing	1860
John Bowman	1861
William L. Leonard	1863
Lewis Tussing	1865
John Bowman	1865
Henry Sheets	1865
William Anderson	1867
George Pendleton	1867
Joseph R. Kagy	1873
Eli J. Sheldon	1873
John Pirrsford	1870
Dorilus Martz	1875
William T. Platt	1876
R. R. Sutherland	1877
Samuel A. Kagy	1879
William T. Platt	1880
John N. Doty	1881
Ed. M. Mills	1883
David P. Hagerty	1885
Lewis B. May	1887
Henry M. Hause	1889
Hilliard D. Boulware	1891
Jacob M. Laws	1892
Willoughby N. Shank	1893
Darius S. Finton	1897
Philip M. Cox	1898
A. L. Cunningham	1899
D. W. Campbell	1901
James B. Steen	1902
Andrew Morland	1903
A. N. Krieg	1904
Harvy O. Fellers	1904
E. M. Crawford	1905
V. Hainen, Jr.	1906

INFIRMARY DIRECTORS.

(The county had no infirmary until 1867.)

Washington Morehart	1867
Moses Kelly	1867
Conrad Renninger	1867
Jacob Thompson	1871
Jacob Bushong	1872
Richard M. Watson	1874
Campbell Byal	1876
David Bibler	1878
James M. Cusac	1883
Jones R. Miller	1884
Alexander Morrison	1888
William R. McKee	1888
Frank Morrell	1890
William J. Cusac	1891
William Karn	1893
Andrew J. Fisher	1894
Charles J. Harkness	1894

William M. Moorhead	1897
Joseph T. Bartoon	1898
Jacob Mitchell	1900
Robert Dorney	1902
Samuel Mosier	1904
Isaac Gibson	1906
David Wright	1907
Frank Copland	1909
David Spangler	1909
August Meuman	1909

PROSECUTING ATTORNEYS.

Anthony Casad	1828
Edson Goit	1832
Arnold F. Merriman	1836
Jacob Barnd, appointed to fill vacancy	1838
Jude Ball	1838
Abel F. Parker	1842
William M. Patterson	1844
John E. Rosette	1849
William Gribben	1854
James A. Bope, resigned to enter army	1862
Henry Brown	1862
William A. Anderson	1868
George F. Pendleton	1872
Aaron B. Shaffer	1880
Harlan F. Burket	1891
Theodore Totten	1894
Charles E. Jordan	1897
William L. David	1903
Charles Blackford	1909

COUNTY TREASURERS.

Joshua Hedges	1828
Edwin S. Jones	1829
Squire Carlin	1831
Edson Goit	1839
Levi Taylor	1843
Wilson Vance	1845
Mahlon Morris	1847
Samuel Howard	1851
Benjamin Huber	1855
William Vanlue	1857
Samuel Spitler	1863
Henry B. Wall	1867
Henry Sheets	1870
Peter Hosler	1875
William J. Creighton	1883
Andrew Moore	1887
Oliver P. Shaw	1889
David Hosler	1893
John Parker	1895
Andrew Bish	1899
William S. Bish	1902
J. W. Whetstone	1904
William J. Frey	1908

PROBATE JUDGES OF HANCOCK COUNTY, OHIO.

The new constitution of Ohio established this office; was adopted in 1851.

James H. Barr	1852
Nathaniel E. Childs	1855
James H. Barr	1858
Alfred W. Fredricks	1861
Gamaliel C. Barnd	1867
Samuel B. Huffman	1873
S. J. Siddall	1879
G. W. Myers	1885
A. E. Kerns	1891
J. D. Snyder	1897
G. G. Banker	1903
H. O. Dorsey	1909

SHERIFFS.

Don Alonzo Hamlin	1828
John W. Wickham	1829
Joseph Johnson	1831
Christian Barnd	1834
Jacob Rosenberg	1838
Elisha Brown	1842
Alonzo D. Wing	1844
Absalom P. Byall	1846
Hiram Williams	1848
Thomas Buckley	1850
James Robinson	1852
William W. Yates	1854
Daniel D. McCahan	1855
Abraham Yerger	1867
Samuel Myers	1869
James L. Henry	1873
Parlee C. Tritch	1877
Charles B. Hall	1881
Lemuel McMannis	1885
George L. Cusac	1887

Joseph T. Bartoon	1891
John Wren	1895
Ervin E. Ewing	1897
Ira Bushong	1901
E. L. Groves	1905
J. S. Johns	1908

RECORDERS.

Wilson Vance	1828
Parley Carlin	1835
Jacob Barnd	1838
John Adams	1844
Paul Sours	1847
Isaac J. Baldwin	1853
Adam Steinman	1860
Luther B. Robinson	1866
Paul Kemerer	1872
Joseph F. Gutzwiler	1878
John B. Foltz	1884
John Baker	1890
John C. Mitchell	1893
Alvin S. Thomas	1896
William F. Bloom	1902
A. C. Ewing	1908

SURVEYORS OF HANCOCK COUNTY.

William Taylor	1828
William L. Henderson	1832
Joel Pendleton	1838
George W. Powell	1854
Joel Pendleton	1857
Edwin Phifer	1876
Ulyssus K. Stringfellow	1885
John W. S. Riegel	1891
Elmer C. Bolton	1896
Edwin Phifer	1897
Elmer C. Bolton	1900
Harry Glathart	1906
Elmer Hilty	1908

COUNTY AUDITORS.

Matthew Reighley	1828
William Hackney	1829
Thomas F. Johnson	1831
Joseph C. Shannon	1832
Edson Goit	1836
Charles W. O'Neal	1837
William L. Henderson	1839
James H. Barr	1842
James S. Balentine	1845
William Mungen	1847
Elijah Barnd	1851
Henry Brown	1855
Aaron Howard	1857
Henry Sheets	1861
Solomon Shaffer	1865
John L. Hill	1869
George S. Mosier	1873
Joseph R. Kagy	1877
William T. Platt	1883
C. B. Metcalf	1890
Surrell P. DeWolf	1896
John A. Sutton	1902
Frank C. Shank	1908

CLERK OF COURT.

Wilson Vance	1828
William H. Baldwin	1835
William L. Henderson	1842
Absalom P. Byall	1848
William W. Siddall	1855
James Dennison	1864
Peter Pifer	1870
Scott W. Prebble	1876
Henry H. Louthan	1879
Presley E. Hay	1885
Louis P. Julien	1891
Phillip W. Ewing	1900
W. P. Alspach	1906

CORONERS.

Thomas Slight	1828
Joseph Dewitt	1831
Peter Byall	1835
Henry Lamb	1837
Noah Wilson	1840
Joshua Hedges	1840
Allen McCahan	1842
Norman Chamberlain	1844
Alonzo D. Wing	1845
Hiram Williams	1846
Harmon Warrell	1850
Garrett D. Teatsworth	1852
Daniel D. McCahan	1854

Edwin Parker	1856
Parley C. Tritch	1861
Abraham Yerger	1865
Frank J. Karst	1873
Daniel F. Cline	1875
T. G. Barnhill, M. D.	1877
John C. Tritch, M. D.	1881
Jesse A. Howell, M. D.	1889
Jacob E. Powell, M. D.	1893
Theron S. Wilson, M. D.	1895
Ralph E. Brake, M. D.	1899
Alfred W. Balsley, M. D.	1903
Don C. Biggs, M. D.	1906
Calvin Todd, M. D.	1908

REPRESENTATIVES FROM HANCOCK COUNTY TO THE STATE LEGISLATURE.

S. M. Lockwood	1830
Josiah Hedges	1831
Harvey J. Harmon	1832
James L. Everet	1833
James L. Everet	1834
James Hubbard	1835
James Hubbard	1836
W. B. Craighill	1837
Parley Carlin	1838
William Taylor	1839
Moses McAnnelly	1840
Moses McAnnelly	1841
G. W. Baird	1842
Henry C. Bish, George Baird	1843
Wm. C. Craighill, Samuel Wagoner	1844
Elijah Huntington	1845
Lyman Parker	1846
John McMahan	1847
Emery D. Potter	1848
Machias C. Whiteley	1849
Machias C. Whiteley	1850
Henry Bishop	1852
John F. Purkey	1856
Parley Carlin	1858
John Wescott	1860
William Gribben	1864
Isaac Cusac	1868
Aaron B. Shaffer	1872
Charles Osterlin	1874
Wm. M. McKinley	1876
Alex. Phillips	1878
Henry Sheets	1880
Wm. H. Wheeler	1882
Absalom P. Byall	1886
Henry Brown	1890
George A. Carney	1892
Charles Bright	1894
Jacob A. Kimmell	1896
Oliver P. Shaw	1898
R. D. Cole	1900
M. M. Carothers	1904
M. G. Foster	1906
D. P. Haggerty	1908

HON. W. H. KINDER

Representative Citizens

HON. W. H. KINDER, judge of the Circuit Court in the Third Circuit of Ohio, to which honorable office he was elected in 1908, has been a resident of Findlay for over two decades and has been a leading member of her bar for the same period. Judge Kinder was born October 12, 1856, at Hamilton, Ohio, and is a son of William Ross and Agnes (Long) Kinder.

Judge Kinder's ancestors came to America from Holland and the first of the family to establish himself in America was Valentine Kinder, who is recorded as a settler in Berks County, Pa., in 1756. His son, Philip Kinder, was born in Holland and he took part in the Revolutionary War.

George Kinder, son of Philip Kinder, was the father of Abraham Kinder, who was the pioneer of the family in Ohio. He entered the land which became the family homestead, in Warren County, Ohio, and it was his industry and Dutch thrift that cleared up the wilderness farm and provided abundantly for a numerous progeny. Of his many sturdy sons, George Kinder, the grandfather of Judge Kinder, was born in Warren County, in 1800. For a long time he engaged in farming and he also became the owner of a line of boats which he operated on the Miami and Erie Canal. He died in 1863, surviving his son, William Ross Kinder, for three years.

William Ross Kinder, father of Judge Kinder, was born in December, 1826, at Franklin, Ohio, and died at Hamilton in his thirty-fourth year. At an unusually early age he was admitted to the bar and displayed remarkable legal ability. When Hon. John B. Weller was appointed a member of the commission to decide the boundary lines between Mexico and California, he left Hamilton, of which city he had been a resident for some time, and went to the West, inviting Mr. Kinder to accompany him as his private secretary. When the work of the commission was satisfactorily completed, a law partnership was formed between Mr. Weller and Mr. Kinder, and they engaged in practice as a firm, for two years in California. In 1852, however, Mr. Kinder returned to the East, was married at Cincinnati, and in the same year embarked in the newspaper business, purchasing and conducting the Hamilton Telegraph, with which he remained identified until 1858. In that year he was elected probate judge of Butler County, but did not long survive his promotion to the Bench, his death occurring on February 10, 1860. He was survived by his widow, formerly Agnes Long, a daughter of Jacob and Maria (L'Hommedieu) Long. To this marriage were born four sons: William R., Charles L. H., Walter H. and Stephen L'Hommedieu Kinder.

Walter H. Kinder was educated in the Hamilton schools, graduating from the High School in 1874, after which he taught school for one year, in Putnam County, and subsequently spent a year as a clerk with Robert Clark & Company, at Cincinnati. He then turned his attention to the law, becoming a student under ex-Gov. James E. Campbell, and was admitted to the bar at Hamilton, March 31, 1879. After several years of initial practice, at Ottawa, Ohio, he located permanently at Findlay and has been prominently identified with the interests of this section ever since. His practice, with the exception of from 1890 until 1893, has been continuous, during the above period he having served in public office, being State superintendent of insurance. When he returned to Findlay he entered into a law partnership with George W. Ross, under the style of Ross & Kinder, which continued until Judge Kinder was elevated to the Bench. For many years he has been a leader in Democratic circles, but has been chary of accepting political office which would in any way interfere with his professional work. His election to the Bench, in 1908, was a just recognition of his judicial qualities which his many years of legal practice had made many times manifest.

On August 26, 1886, Judge Kinder was married to Miss Helen F. Tupper, a daughter of the late Dr. C. E. Tupper, formerly of Ottawa, Ohio, and they have four children: Walter Tupper, Margaret V., William Randall and Charles Edwin. Judge Kinder and family reside in one of Findlay's handsome residences, their home being situated at No. 824 Washington Avenue.

HON. GEORGE F. PENDLETON, formerly mayor of the city of Findlay, O., prosecuting attorney of Hancock County and judge of the Court of Common Pleas, for years has been a prominent and useful citizen of Western Ohio, and is one of the leaders of the Findlay bar. He was born September 27, 1840, in Waldo County, now known as Knox County, Me., a son of Darius Pendleton, who brought his family to Hancock County, O., in 1841.

George F. Pendleton's boyhood was spent on his father's farm and he gained his education in the country schools and early began to teach, spending his winters in the school-room and his summers in agricultural labor. This continued up to the second year of the Civil War. His father and a younger brother, John Pendleton, having become soldiers, he had remained on the farm during the first year of the great struggle, but in 1862 he also entered the army, becoming a member of Co. G, 118th O. Vol. Inf., of which his father was first lieutenant. In this same regiment, but on detached service at times, he remained until June 5, 1865, when he was mustered out at Columbus. Entering as a private, he was soon advanced in rank to corporal and later was made chief clerk of the post commissary, with headquarters at Kingston, Tenn. After the war was over much remained to be done in every department and Mr. Pendleton's business qualifications were recognized by those in charge of closing the military accounts of different officers, they inviting him to give them assistance in this arduous clerical work. He accepted, but his health had been already impaired and in the succeeding August he felt it necessary to resign from this commission and afterward returned to Hancock County.

After a period of recuperation, Mr. Pendleton re-entered the educational field, where his previous record had been most creditable, and he continued to teach until 1867, when he was appointed chief deputy to the Collector of Internal Revenue for the old Fifth District of Ohio, an office he filled for two years, making his headquarters at Findlay. While in the South he had studied law and completed his course with the firm of Brown & Anderson, at Findlay. He was admitted to the bar in December, 1870, immediately entering into a law partnership with W. H. Anderson. The firm of Anderson & Pendleton was dissolved in 1876, at which time Mr. Pendleton became associated with his former preceptor, Henry Brown, with whom he continued for two years. Mr. Pendleton then practiced alone until 1883, in the fall of that year being elected judge of the Court of Common Pleas, for the Tenth District. For seven years Judge Pendleton filled that office with the dignity and efficiency of a thoroughly qualified man, and since retiring from the Bench has continued in private practice and has been connected with a large part of the important litigation in the courts of this section.

Judge Pendleton has ever been an active citizen and his worth has many times been publicly recognized. He has been called upon to serve on many boards and commissions designed to assist in the advancement of the general welfare. In April, 1870, he was elected mayor of Findlay, in which honorable office he served usefully for two years, leaving the municipal chair in order to assume the duties of county prosecuting attorney. From January 1, 1872, until January 1, 1876, he proved himself an able, forceful and courageous public official in that difficult office. From 1867 to 1875 he was county school examiner and also city school examiner for a number of years. Judge Pendleton's interest in educational work has never lessened and even when suffering from the stress and strain of great responsibilities, he has continued to assume the cares of offices by which he has been able to add to the efficiency of the public school system in county and city.

HON. O. P. SHAW, one of the prominent farmers and highly esteemed citizens of Hancock County, O., is the owner of 370 acres of valuable farm land, 180 acres of which lie in Blanchard Township, and the remaining 190 acres, on which he resides, are located in Section 7, Liberty Township. He was born October 1, 1844, in Blanchard Township, Hancock County, O., a son of George and Elizabeth (Wise) Shaw, and is a grandson of George Shaw, Sr., who came to Hancock County, O., about 1826 and settled in Blanchard Township.

George Shaw, Jr., was born in Stark County, O., and when a small boy came with his parents to Hancock County, and settled in Blanchard Township, where he spent the remainder of his life. He was a farmer by occupation, and politically was a Democrat, but never sought office. His marriage with Elizabeth Wise, who died in about 1849, resulted in the birth of six children, all but two of whom are still living. Mr. Shaw died in 1855 at the age of thirty-three years, and was buried at Duke Cemetery in Blanchard Township.

Hon. O. P. Shaw was reared in Blanchard

Township, and after completing his education, which was obtained in the local schools and at Findlay, joined the Union army, for service in the Civil War, enlisting with Co. H, 15th Ohio Vol. Inf. He was taken prisoner once, while in Kentucky, but paroled in a few days, and was wounded at the battle of Chickamauga. After the close of the war Mr. Shaw returned to Blanchard Township, where he continued to reside for two years after his marriage, and in 1868 located on his present farm in Liberty Township. Here he engaged in general farming until elected treasurer of Hancock County, in 1888, and during his four years of incumbency resided at Findlay, returning to his father-in-law's farm in Blanchard Township in 1896. In 1900 he again removed to his farm in Liberty Township, and has since continued his residence here. Mr. Shaw was elected a member of the Ohio Legislature in 1897 and served one term as a member of that body, after which he retired from political activities. He has always been a Republican in politics and has served as a trustee of the township.

Mr. Shaw was actively interested in the Findlay Basket Factory, which was destroyed by fire in 1895 and was never rebuilt; has served as a member of the Hancock County Agricultural Board, and has been president of the Peoples' Banking Company of McComb, since the reorganization and incorporation of same.

Mr. Shaw married Mary J. Downing, who is a daughter of David and Maretta Downing, of Blanchard Township, and their union resulted in the following issue: Olive; May, who died in 1893, aged twenty-two years, was buried at the Findlay Cemetery; Ethel, who died January 5, 1890, aged seventeen years; Vina, who is the wife of W. F. Brickman of Findlay; David; George, who is a resident of Blanchard Township, married a Miss Weber; Jane, who is the wife of Edward Reimund of Findlay; and Dorothy, who is the wife of Merle Swartz of Findlay. The family attends the Presbyterian church.

WILLIAM DIEBLEY, one of the substantial and representative residents of Big Lick Township, Hancock County, O., owning 155 acres in Section 2, owns a second farm of eighty acres situated in Section 35, Washington Township. He was born at Canton, O., June 23, 1832. His father was known as Henry Duble and this name was retained by him as long as he lived, but changed to Diebley, when his widow and children later came to Hancock County.

Henry Duble was born in Germany and before marriage came to America and established himself in the meat business at Canton, O., where he was later joined by the lady to whom he had been attached in their native land. They were married at Canton and there Henry Duble died. Of the five children, William is the only survivor. Two daughters, Katherine and Mary, died early, and one son, Lewis, was killed while serving as a soldier in the Civil War. The mother was married a second time, becoming Mrs. Jacob Barger, and two sons were born to the second marriage: John and George Barger, the latter of whom is deceased.

William Diebley was two years old when he was brought to Big Lick Township, Hancock County, and he remained with his stepfather until he was twenty-one years of age. He obtained his education in an old log schoolhouse in the neighborhood. When he started out for himself he went to Iowa, where he entered 500 acres of land from the government and lived there for fourteen years and then came back to Hancock County and bought his present home farm from his step-father. For many years Mr. Diebley carried on general farming and stock raising for himself but in late years the heaviest responsibilities have been assumed by his son. In addition to his farm properties, Mr. Diebley owns three fine residences at Fostoria.

On May 14, 1857, Mr. Diebley was married to Miss Amelia Sweet, who was born in New York, December 20, 1840, and they have had six children born to them and they have fourteen grandchildren, descendants of whom they have every reason to be proud. Lewis E., the eldest son, resides at Miller City, O., and has one son, Chester. Carrie A., the eldest daughter, was married first to Clark Young, who is deceased, and they had one child, Frances, and was married second to Rev. M. S. White, of Fostoria, and they have one child, Ruth. William lives with his family at North Baltimore, O., and has two daughters: Ethel and Hazel. Ida J. married Charles Moore, of Washington Township, and they have four children: Len, Ralph, Floyd and Stanley. John is his father's farmer, resides at home, married Millie Fruit, and has three children: Harold, Frances and Elden. Minnie is the wife of Robert Graham, of Washington Township, and they have two children: Clarence and Ellsworth. Mr. and Mrs. Diebley are members of the United Brethren church. In politics he is a Republican and while living in Iowa, during the Civil War, he was an enrolling officer. Mr. Diebley is widely known and is held in very high regard by his fellow citizens.

CHARLES C. DUKES, who is engaged in general farming on a tract of eighty acres, located in Section 10, Marion Township, Hancock County, O., was born June 9, 1858, at Vanlue, Hancock County, O., and is a son of John and Elizabeth (Meeks) Dukes.

John Dukes was a native of Fairfield County, O., but subsequently located in Hancock County where he followed carpentering for some years. He later purchased a farm of forty acres located about two miles east of Findlay, and died there in 1872 from injuries received by a kick from a horse. He married Elizabeth Meeks, who died in 1868. Her father was one of the early settlers of the county. Their union resulted in the birth of three children: Alice, who is the wife of Harry Williams; Charles C., the subject of this record; and Dora, who is the wife of John Health.

Charles C. Dukes at an early age was left an orphan and afterward made his home with George Stow, who resided on the old Heimhofer farm about three miles north of Findlay. His educational advantages were very limited, as he was obliged to assist with the farm work, and at the age of eighteen years he left the Stow household and began working out by the month. He later rented the Robert Thornburg farm of 115 acres in Allen Township for three years, then operated the George Stow farm of eighty acres for six years, and the George Snyder farm of 174 acres for three years, and he and his son also operated the Goodman farm of 174 acres for about six years. In 1890 he purchased his present farm of eighty acres from the Coons estate, and has since added many improvements to the place.

Mr. Dukes was first united in marriage with Ida Wagner, and they had one son, Clyde, who was born June 8, 1883. He assists his father in operating the farm. Mr. Dukes formed a second union with Elizabeth Giltz, a daughter of Peter and Jane Giltz, of Defiance, O., and they have one daughter, Dora, who was born June 23, 1904. Mr. and Mrs. Dukes are members of the Baptist church. He is politically a Democrat, and is affiliated with the Order of Ben Hur at Findlay, O.

LEROY E. GARBER, of the firm of Garber & Garber, proprietors of the Garber Seed & Wool Company, with business quarters at No. 109 E. Sandusky Street, Findlay, O., was born on a farm in Big Lick Township, Hancock County, O., eight miles east of Findlay, November 21, 1876. He is a son of Christian and Elizabeth F. (Leonard) Garber.

Christian Garber was born in France in 1848 and when five years old was brought to America by his father, Peter Garber. The latter settled first on farming land in Marion Township, Hancock County, O., and later moved to Big Lick Township, where he died in 1892. Christian Garber continued to live in Big Lick Township until 1893, when he came to Findlay, but still retains a forty-acre farm. He married Elizabeth F. Leonard, who was born in Big Lick Township, a daughter of Samuel B. Leonard, who was a native of Columbiana County.

Leroy E. Garber was reared on the home farm and attended the country schools and later taught one term of school in Paulding County, O. He was twenty-two years of age when he left the farm and came to Findlay, and on October 2, 1899, started the present business. The company handles all kinds of seed and wool. The business is in a prosperous condition and Mr. Garber is numbered with the successful young business men of the city.

Mr. Garber married Miss Aura D. Enfield, who was born and reared in Big Lick Township, a daughter of James A. Enfield, who was a prominent farmer of that section and whose death took place in October, 1909. Mr. and Mrs. Garber have three children: John Wilbur, Frances Emma and Howard, aged respectively, eleven, nine and four years. Mr. Garber has been identified with Lodge No. 400 Knights of Pythias for some years.

BATEMAN B. POWELL, formerly county commissioner of Hancock County, O., and a leading farmer of Blanchard Township, where he owns 170 acres of valuable land, was born in Fairfield County, O., May 14, 1833. His parents were Daniel and Eliza (Beatty) Powell.

Daniel Powell was born in Union County, Pa., and was seven years of age when his parents brought him to Fairfield County, in 1814. He grew to manhood there and in 1832 was married to Eliza Beatty, who died at the age of sixty-eight years. They had eight children: Bateman B.; Peter, who is deceased; Mary, who married Jacob Whitehurst; Sarah, who married Samuel Raney; Daniel, who married Mary Cheesebrough; Elizabeth, who was married twice, first to Charles Weisner and second to James Wells; Alexander, who married Rebecca Jackson; and John, who married a Miss Shoeman. After marriage, Daniel Powell and wife lived for a time in Fairfield County and then moved to Wyandot County and there both he and wife died, he surviving to the age of seventy-seven years. He was a farmer and in early manhood had visited Blanchard and Eagle Townships in Hancock County and had entered several tracts of land but had never lived on them. He was a stanch Jacksonian Democrat and so impressed his sons with the justice of those principles that all have followed in his political footsteps. Both he and wife were members of the United Brethren church.

Bateman B. Powell remembers the first school he attended, the log cabin in which it was held being at Greencastle, in Fairfield County. The trustees had not expended a great deal of money to fit the building with many luxuries, the seats being of rough slabs and a fireplace at one end affording the heat necessary. However, at that time, many of the pioneer homes were no better equipped and the stern discipline of those days certainly produced a type of men and women which the present generation can regard with pride and in many cases, may profitably emulate. After his marriage, in 1857, Mr. Powell and wife remained on a farm in Fairfield County until the spring of 1860 and then came to Blanchard Township, Hancock County, where they have lived ever since and have the distinction of being the oldest married couple in this township. Mr. and Mrs. Powell went to housekeeping in a cabin of two rooms, on a tract of twenty acres. Gradually he increased his possessions until he had acquired 400 acres, this land having been entered from the Government in 1833. Mr. Powell has been generous to his children, church and neighborhood, having given all his land away except 170 acres. He cleared about 300 acres himself, put in the drainage and erected the substantial buildings.

In Fairfield County, O., in 1857, Mr. Powell was married to Miss Elizabeth Whitehurst, a daughter of John Whitehurst, and they have four children: Margaret V., who married Charles Heckman and they live in Blanchard Township; America Belle, who is the wife of John Kisseberth, a farmer in Blanchard Township; Sherman E., who married Ella Faller, now deceased; and Henderson E., who lives at Findlay, married Daisy Wells. Mr. and Mrs. Powell are members of the Methodist Episcopal church and he assisted liberally in the erection of the brick edifice at Benton Ridge. He served as county commissioner from December 6, 1880, to December 3, 1883, retiring from office with the confidence of his fellow citizens to accompany him into private life

HARLEY CLIFTON ELSEA, a general farmer in Jackson Township, where he owns seventy-eight acres of excellent land, was born in Eagle Township, Hancock County, O., August 18, 1881, and is a son of I. N. and Jane (Line) Elsea.

I. N. Elsea and wife were both born in Hancock County and they live retired on North Lincoln Street, Findlay. During his active years he operated a livery stable for two years but with that exception, devoted himself to farming. He is a survivor of the Civil War and during his months of service was with the troops that were active in preventing the cooperation of the forces under Gen. Lee and Gen. Johnson.

Harley C. Elsea was educated in the public schools and his business has always been farming, with the exception of the year 1901. when he was associated with his father in a livery business, on West Crawford Street, Findlay. He then returned to the homestead and rented it for five years, after which he purchased his present farm of his father and has been engaged in its cultivation and improvement ever since.

On September 14, 1905, Mr. Elsea was married to Miss Rose Glaspie, and they have one child, Edna Flora, who was born March 4, 1907. Mr. Elsea votes the Republican ticket but has never aspired to office, finding both profit and contentment in devoting himself to his agricultural interests.

LYMAN M. CONINE, who is the owner of what was long known as the old D. C. Warner farm, containing ninety-nine acres, situated in Section 15, Portage Township, Hancock County, O., was born in Blanchard Township, Hancock County, March 20, 1860, and is a son of James Harvey and Elizabeth (Greer) Conine.

James H. Conine was born in the State of New York, a son of Peter Conine, but was reared in Licking County, O. He married there and then came to Hancock County and settled on a farm in Blanchard Township. When civil war broke out he enlisted for service and remained in the army for three years and then returned to his farm of 120 acres. He subsequently sold it and his death occurred at McComb, in January, 1908, his wife having passed away February 8, 1901.

Lyman M. Conine was reared and educated in Blanchard Township and has been engaged in farming since the termination of his school days. After marriage he bought forty acres of farm land in Blanchard Township, Putnam County, and also owned forty acres in Blanchard Township, Hancock County, and for seventeen years he and family lived on the former farm. He then moved to the old farm in Hancock County and operated it for two years, moving from there to a farm north of Duke's church, containing eighty acres, which he sold six years later and came to his present place in January, 1909. He makes no particular specialty but is a first class all round farmer. His place contained 100 acres before one acre was given as the site for the Pleasant Hill schoolhouse.

On March 13, 1884, Mr. Conine was married to Miss Jennie Nelson, who was born in Wood County, O., a daughter of Calvin and Mary Ellen (Ragan) Nelson. Calvin Nelson was born in Hancock County, O., a son of Thomas Nelson, one of the early pioneers, who lived in Cass Township. The mother of Mrs. Conine died when she was but two years old and the father when she was eight years older. Four children were left orphans and for a time she was cared for by an aunt, but later was taken by a family of no relationship, with whom she lived until her marriage. Her own four children have had a happier fate, having been reared in a home of plenty and given every advantage within the power of loving and tender parents. To Mr. and Mrs. Conine three daughters and one son have been born, namely: Ivy Estella, who is the wife of Rollo Sheidler and they have one son, Lloyd Raymond; Trudy, who is the wife of William Ireland, and they have one daughter, Helen Conine; Josiah Ray, and Bessie A.

REV. CHARLES I. BROWN, D. D., who since 1904 has been president of Findlay College, an institution of learning of which the citizens of Findlay, Hancock County, O., are

REV. CHARLES I. BROWN, D. D.

justly proud, is a man who has already done much to advance the educational and material interests of the college. He was born at Woodbury, Bedford County, Pa., December 11, 1861, and is one of a family of eleven children born to his parents, Abraham S. and Mary (Keifer) Brown.

Dr. Brown was reared on his father's farm, his early environment being that of the average country boy, and his opportunities for development the best that could be afforded in a home of industry, thrift and Christian government, where there were many brothers and sisters. He was mentally gifted and his ambition spurred him on to secure a collegiate education, and in 1888 he was graduated from Dickinson Seminary, at Williamsport, Pa. Having made his choice of a profession, he then entered into the ministry of the Church of God, in which he proved acceptable, and served different charges for sixteen years. He has been a delegate to the General Eldership on five different occasions, and has served on important boards, such as the Board of Missions and Board of Publication. He was assistant editor of the Church Advocate from 1899 to 1904, and he represents the Churches of God in the United Society of Christian Endeavor as a trustee. He is, in fact, probably as well known as any man in the Churches of God today.

In 1904 Dr. Brown was called to Findlay to become the recognized head of Findlay College, an educational institution which had been founded here in 1882 by the religious body with which he has been identified since early manhood. The history of this college is one of great interest, and is deserving of more extended mention than we can here give it, for it is a record of earnest effort and personal sacrifice by good and pious people, many of whom have now passed away, leaving this as a great and lasting memorial of their useful lives. Since Dr. Brown has taken charge of the institution a most encouraging period of prosperity has set in, and with each year the future grows brighter. Under his presidency the courses have been greatly strengthened, the student body increased and the finances built up. The college has been cleared of debt, over $10,000 has been expended in improvements on the property. Two new properties have been added—the "Carrothers' Home" for the president and the "Henderson Home" for dormitory purposes. Aside from the regular income of the college, President Brown has collected over $12,000 for running expenses and the Endowment Fund has been increased over $50,000. It is thus apparent that Dr. Brown is a man well fitted for his present responsibilities, and he enjoys the respect, confidence, and esteem, not only of the college trustees, but of the citizens of Findlay generally who are interested in the promotion of their higher education.

Dr. Brown was married at Woodbury, Pa., to Miss Susie Hoffman, a daughter of Christian Hoffman, and they have had three children, Ruth, Harry, and Frances. The death of Mrs. Brown occurred September 9, 1909. The family residence is at No. 1113 N. Main Street, Findlay.

MORRIS A. DARBYSHIRE, M. D., who has been engaged in the practice of medicine and surgery at McComb, O., since 1895 and is identified with the various interests of the place as becomes an earnest and public spirited citizen, was born in Sugar Creek Township, Putnam County, O., May

19, 1863, and is a son of Jesse C. and Lydia A. (Pierce) Darbyshire.

Jesse C. Darbyshire was born December 5, 1817, in Fayette County, Pa., and died in Putnam County, O., August 14, 1894. His father, Thomas Darbyshire, was born in Ireland, of English parentage, and came to America and died in Clinton County, O. Jesse C. Darbyshire was a farmer. He was a boy when his parents came from Pennsylvania to Guernsey County, O., and from there to Clinton County, and he grew to manhood in the latter, married there May 22, 1844, and moved into Putnam County in 1845. He was a man of character and local importance to some degree but was never willing to accept office although he ever discharged the duties of citizenship, voting first with the Whig party and later with the Republicans. He was a member and liberal supporter of the Christian church. He married Lydia A. Pierce, who survives and is a resident of Columbus Grove. She was born in Logan County, O., December 2, 1825, and is a daughter of James and Margaret Pierce who moved in her girlhood from Logan to Clinton County. There were nine children born to Jesse C. Darbyshire and wife, all of whom survive with one exception. The family record stands as follows: Mary M., born May 5, 1845, is the wife of Jacob Deffenbaugh, of Columbus Grove. James T., born September 17, 1847, is a resident of California, where he is engaged in growing fruit. John W., born May 13, 1850, resides at Deadwood, S. D. Benjamin M., born November 23, 1852, lives near Rimer, in Putnam Conuty, O. David D., born March 20, 1855, is in business at Bluffton, Ind. Harvey N., born August 20, 1857, died August 25, 1860. Eliza J. and Samuel J. are twins, born September 28, 1860. The former is the wife of Albert C. Wood, of Rimer, O., and the latter is a practicing physician at Lima, O. Morris A. is the youngest of the family.

Morris A. Darbyshire attended the public schools until qualified to become a teacher and for eight years he alternated teaching school and attending the universities at Lebanon and Ada, O., and received the degree of B. S. from the latter institution. He turned his attention to the study of medicine, at Fort Wayne, Ind., in the office of his brother, and after due preparation entered Starling Medical College of Columbus, O., and on March 6, 1890, was graduated from that institution with honorable mention for scholarship. After practicing for a short time at Gilboa, in Putnam County, he established himself at Ottawa, but in 1895 he came to McComb and has made this place his permanent home. He has built up a large practice and the care of it occupies his time almost exclusively. He is a member of the Hancock County Medical Society, the Northwestern Ohio District, the Ohio State and the American Medical Associations.

Dr. Darbyshire was married February 1, 1893, to Miss Mary M. Matthias, a daughter of Dr. and Mrs. A. C. Matthias, of McComb, O., and they have three children: Hobart M., who was born at Gilboa, October 29, 1895; Miriam G., who was born at McComb, May 3, 1900; and Pauline L., who was born March 15, 1908. Mrs. Darbyshire was educated in the public schools of Gilboa and at Findlay College and is a talented musician.

Dr. Darbyshire is an active Odd Fellow, having represented the 18th District in the Grand Lodge of Ohio from 1902 to 1906. He is a member of McComb Lodge No. 354, Ashdor Encampment No. 195, and Pleasant Rebekah Lodge No. 375, I. O. O. F.

He is also identified with Findlay Lodge No. 227, F. & A. M., Findlay Chapter No. 58 R. A. M., Findlay Council No. 50, R. and S. M., and McComb Court, No. 103, Tribe of Ben Hur. Dr. and Mrs. Darbyshire and son Hobart are members of the Church of Christ at McComb.

SOLOMON SNIDER, a substantial citizen of Big Lick Township, Hancock County, O., who owns 182 acres of valuable farm land situated in Sections 6 and 7, on both sides of the Tiffin turnpike road, about eight miles east of Findlay, was born in the old log house on his father's farm in Findlay Township, Hancock County, March 8, 1839. His parents were Samuel and Catherine (Spangler) Snider.

Samuel Snider was born in 1811, in Perry County, O., and moved from there to Fairfield County, where he married and then came to Hancock County and entered 160 acres of land in what was then Findlay but is now Marion Township. He erected a primitive dwelling, a shanty of poles, which sufficed for a time, and then began the clearing of his land. He became a man of standing in his neighborhood and received, as he deserved, the consideration of his fellow men. He died about the time he reached his seventy-third year and his wife, born in 1812, did not long survive him. They had nine children born to them, namely: Isabella, Louisa, Solomon, Mary, William, Emanuel, Rebecca, Emma and George, and all survive except the three eldest daughters.

Solomon Snider grew to manhood on the home farm and attended the old log schoolhouse sessions when opportunity offered. In 1862 he enlisted for service in the Civil War, entering Co. G, 118th O. Vol. Inf., and during his service of four months was stationed in Kentucky. He is identified with the G. A. R. Post at Findlay. Mr Snider has always carried on general farming and in late years has shared his responsibilities with his son, Edgar, who is now the practical manager The family home is a handsome brick residence set well back on the south side of the highway to Tiffin. Its surroundings are particularly attractive, the shade trees, shrubbery and choice flowers presenting a beautiful picture and indicating refinement and taste.

On March 27, 1860, Mr. Snider was married to Miss Ruth Davis, a daughter of Daniel and Jane Davis, and they have had five children: Lewis, who married Rose Helm, lives in Chicago; Lucetta, who is the wife of A. Russell, of Big Lick Township and they have four children—Floyd, Ethel, Arnot and Ruth; Emmett, who resides in Marion Township, married Martha Adams and they have four children—Otto, Frank, Inez and Dorothy; Edgar, who married Jennie Wisley and they have four children—Chauncy, Glenn, Kenneth and Clifford; and Olive. In politics, Mr. Snider is a Republican, one from conviction, never having any political aspirations or permitting his name to be put forward for office.

LEMUEL McMANNESS, one of Findlay's stable business men, manager of the McManness Milling and Grain Company, has been identified with many important interests in both city and county and in 1884 was elected to the important office of sheriff. Mr. McManness was born in 1846, at Plainsfield, Cumberland County, Pa., a son of John and a grandson of James McManness, the latter of whom came from Ireland to America, in 1776.

Lemuel McManness was ten years old when his parents came to Ohio and settled at Findlay, where his father engaged in business as a cabinetmaker. In 1862, before his school days were over, he obtained a position as clerk in the sutler's department of the 57th O. Vol. Inf., and after efficient service in that position for more than a year, he was made clerk in the office of the quartermaster of the Army of the Cumberland, and one year later was given a clerical position in the office of the medical department. When the war closed, Mr. McManness returned to Findlay and for about five years engaged in clerking for Davis & Green, after which, in 1870, he embarked in the grocery business for himself, which he discontinued thirteen years later in order to enter into the manufacture of linseed oil. In 1889 he bought the Findlay flour mill and conducted it until it was destroyed by fire in November, 1891. In 1895 he resumed business in the grocery line which he continued until 1898, when he also became interested in a stone quarry, and in 1905 he became identified with the milling and grain business which bears his name and of which he is the capable manager. The McManness mill is equipped with improved machinery and its capacity is 150 barrels per day, employment being given to eight men. The special brands of flour manufactured are the "Bob White" and the "Calla Lily."

Mr. McManness' activity in commercial life has been supplemented by his interest in public matters, for he has been a public-spirited and progressive citizen. In 1870 he was elected city clerk, to which office he was reelected, and in 1884 he was elected sheriff of Hancock County. In his public life as well as in his private affairs, Mr. McManness has followed out practical, common sense ideas and his whole career has been one to reflect only credit upon him.

Mr. McManness was married in 1875, to Miss Amanda E. Kimmons, of Findlay, and they have two children. The family home is located at No. 838 South Main Street, Findlay. In his political affiliation he is a Republican and he has been an important factor in party councils.

CORY E. MOSIER, whose fine farm of 160 acres is situated in Section 9, Marion Township, Hancock County, O., lying on both sides of the Tiffin turnpike road, is one of the representative men of the township. He was born September 11, 1855, on the old home farm in Marion Township, and is a son of Henry M. and Catherine (Swab) Mosier.

Henry M. Mosier was born in Virginia and left his native state in early manhood and came to Fairfield County, O., moving from there to Hancock County after his first marriage. In his earlier years he worked as a carpenter and builder and some of the structures he erected are still standing in Hancock County, but later he devoted himself entirely to farming and stock raising. He died in March, 1881, at the age of seventy-one years. He was married the first time to Catherine Davis, who, at death, left three children: Samuel; Mary, who married George Wolfe; and John P. His second wife, Catherine Swab, was born in Pennsylvania and died in February, 1883, aged sixty-nine years. They had one son, Cory E. Henry M. Mosier was well known all through this section of Hancock County. When he came to Marion Township the forest was so dense that he had to clear a place before he could build his round log house and barn. His son, John P. Mosier, resides on the old homestead.

Cory E. Mosier grew to manhood on the home farm and obtained a district school education. He early turned his attention to agricultural pursuits and farming and stock raising have mainly occupied him ever since. In 1885 he bought his present farm which was then known as the Amos Stover farm, and has improved and enriched it to a large degree.

On July 10, 1881, Mr. Mosier was married to Miss Mary E. Harold, who was born in Westmoreland County, Pa., a daughter of David and Margaret (Bear) Harold, both now deceased. Mr. and Mrs. Mosier have two sons: Clyde and Lester. The former is the home farmer. He married Ada Conway and they reside across the turnpike road from his father. Lester is a student in the Findlay Business College. Mr. Mosier and wife are members of the Methodist Episcopal church. In politics he is a Republican. He has served his township as a member of the school board and as supervisor.

McCONNELL B. SMITH, who was born in Hancock County, O., on a farm in Jackson Township adjoining the one on which he lives, on March 17, 1868, has devoted the larger part of his mature life to agricultural pursuits. His parents were Michael and Calista (Bare) Smith.

Michael Smith was born in Germany in 1839 and died in Jackson Township, Hancock County, December 24, 1870. He came to America when young, in company with his parents who landed at New York and came from there to Jackson Township where they entered eighty acres of government land. Michael Smith grew to manhood and married Calista Bare, who was born in Hancock County and died in Jackson Township, August 21, 1893. They were good people and were widely known.

McConnell B. Smith attended the schools in Jackson Township and went from there to Mt. Blanchard, where he remained a student for four years, during this tirme being under the instruction of such teachers as J. W. Corbin, W. O. Blosser and H. Walter Doty. In 1887 he received his certificate to teach school. Mr. Smith votes with the Democratic party. In 1888 he was elected township clerk and served in that office for ten years. He is an active citizen in all that concerns the public welfare and is a strong supporter of the public school system.

In 1889, Mr. Smith was married to Miss Orra E. Lee, a daughter of Noah and Mary Elizabeth (Sampson) Lee, and they have had seven children, namely: Harry, who is engaged in the oil business, resides at home; Dean, who attends the local school; Eugene, who died in infancy; and Marie, Mary, Richard M. and Dorothy Margaret, all live at home. Mr. Smith has been a member of the Methodist Episcopal church at Stoucktown for some eight years. He is identified with the Odd Fellows, belonging to Mt. Blanchard Lodge No. 344. He is one of the representative men of Jackson Township.

EDWARD S. LYON, one of the leading agriculturists and highly esteemed citizens of Allen Township, Hancock County, O., resides on a farm of eighty-five acres located in Section 1, on the Perrysburg turnpike road, and has been a resident of this county since 1855.

He was born June 4, 1847, in Crawford County, O., a son of Charles and Mary (Salmon) Lyon, the former of whom died when our subject was a lad of four years.

Edward S. Lyon came to Hancock County, O., in 1855, with his mother and step-father, Isaac Ausenbaugh, who settled on land in Allen Township. There he was reared and attended the school of District No. 1. He has always followed farming, and after his marriage lived for fifteen years on his step-father's farm in Allen Township, just one-half mile west of his present farm, to which he came on August 4, 1880, and which he had purchased a few years previously. He has made all of the improvements on the place, clearing the land and tiling it, and erecting a dwelling, a barn, and other necessary farm buildings. Here he has since carried on farming and stock raising, making a specialty of raising hogs.

On December 27, 1866, Mr. Lyon was joined in marriage with Anna Eliza Deming, who was born and reared in Portage Township, a daughter of Treat and Catherine (Lyons) Deming, and they have six children: James, Henry, Mary, Emma, Clystia and Elmer. James, a clerk in the postoffice at North Baltimore, married Myrtle Aiken and they have one son, Albert. Henry, who is engaged in farming in Portage Township, owns a tract of 115 acres, in Oklahoma, and also twenty-three acres in Portage Township, operates and resides on a tract of forty-two acres which his father owns in that township. He married Belle Perry, and they have two children, Ray and Grace. Mary is the wife of Jacob Smith, who resides near Saline, Mich., and they have three children: Viola, Elizabeth and Edward. Emma is the wife of Henry Brinkman, who owns a farm of seventy-five acres, one mile east of Van Buren, O., and they have three children: Floyd, Bertha, and Ruth Aneliza. Clystia is the wife of Bonda Spitler, who lives near Saline, Mich. They have two children, Kennith Edward and Dorothy. Elmer, who is a resident of North Baltimore, married Barbara Stutz, and has one daughter, Alma.

Mr. Lyon served two years as supervisor of Allen Township. He is a member and trustee of the United Brethren church.

W. W. SCOTHORN, justice of the peace and a general farmer, whose seventy acres of fine land lie in Section 10, Orange Township, Hancock County, was born in Eagle Township, this county, January 4, 1865. His parents were A. W. and Eliza (Walters) Scothorn.

A. W. Scothorn was born in Reed Township, Seneca County, O., and was reared on his father's farm and remained until about eighteen years old and then came to Hancock County and worked at various things here and in Indiana until his marriage in 1860. In 1868 he sold a farm he owned in Michigan and moved to Orange Township, Hancock County, where he became a man of prominence. When he came first to Hancock County he worked on his brother-in-law's farm for three years and then rented land for six years and then bought the farm in Orange Township on which his widow resides. He took much interest in public matters and was a zealous Democrat and by that party was frequently elected to office. He served as township trustee, as township clerk, and was elected township treasurer but declined that office. When the local Grange, Patrons of Husbandry, was established he lent his influence to the movement and served as its secretary. He was a member of the Baptist church. His death occurred in February, 1908, at the age of seventy-three years and his burial was in Bishop's Cemetery in Eagle Township. A. W. Scothorn was married October 14, 1860, to Eliza Walters, a daughter of Lower Walters, a native of Virginia, and they had three children: Florence R., who married George Rote, who is a resident of Van Wert, O.; W. W.; and H. H., who resides at Findlay.

W. W. Scothorn received his primary education in the public schools of Orange Township and then attended Findlay College. Later he alternated teaching school in Orange Township and attending the Ada Normal School, but after marriage came to his present farm which he took possession of before any of the buildings had been erected except the residence. All other improvements he has made and they are of a very substantial character. He carries on farming along general lines which includes the raising of stock, particularly hogs and he has many head of these to market every year. In politics he is a Democrat and has served acceptably in township offices, one year as assessor and for the past nine years he has been a justice of the peace.

In April, 1899, Mr. Scothorn was married to Miss Flora Pochert, a daughter of William Pochert, of Huron County, Mich., and they have three children: William A., John Park and Walter Warren, Jr. The two older sons are bright, manly boys, devoted to their school books.

JEROME M. MARTIN, senior member of the firm of Martin & Weinland, hardware merchants at McComb, O., was born in Pickaway County, O., April 8, 1854, and is a son of John L. and Elizabeth (Burnley) Martin.

John L. Martin was born in Virginia, where his father died. He came to Pickaway County, O., when young and spent his subsequent life there, dying in 1861. He was a merchant at what was then called Genoa, but is now known as Commercial Point. His first marriage was to Elizabeth Burnley, who was also born in Virginia, a daughter of James Burnley by whom she was brought to Ohio when young. Of this marriage, Jerome M. Martin is the only survivor, two other sons, Theodore and Howard, being deceased. His second wife was Jane Fulcher, who is also deceased. They had two sons and one daughter: John L., who is a merchant at Commercial Point; Thomas J., who is an instructor in the civil engineering department of the Ohio Normal University at Ada; and Henrietta, who is the wife of William Wright of Grove City, Franklin County, O.

Jerome M. Martin was reared on a farm near Commercial Point, O., where he remained until he was twenty-one years of age, attending school irregularly in the meanwhile. He then went to Napoleon, O., where he engaged in carpenter work and became a contractor and continued there until 1888 when he came to McComb. Here he embarked in the hardware business in partnership with Mr. Weinland, their first location being in an indifferent frame building which soon proved entirely inadequate to the growing demands of their trade, and in 1895 Mr. Martin and Mr. Weinland erected the present commodious structure.

The firm carries a large stock in all lines of hardware and does a prosperous business. Mr. Martin individually has a number of additional business interests. He is vice-president of the People's Bank at McComb, and is secretary and treasurer of the Bohemian Pottery Company, at Zanesville, O.

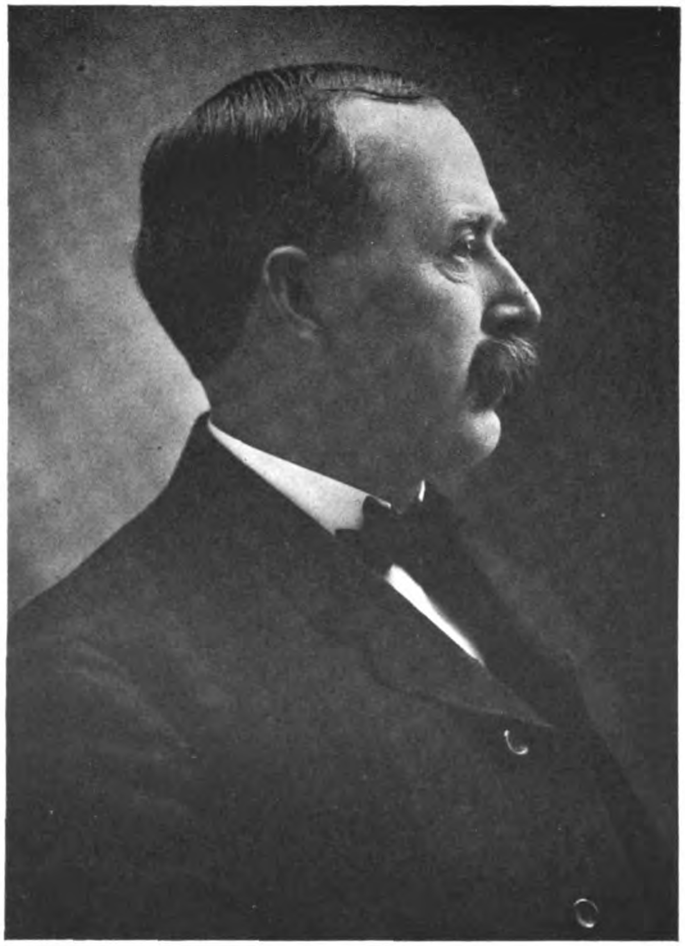
In 1878, Mr. Martin was married to Miss Clara J. Weaver, of Napoleon, O., a daughter of Philip and Caroline Weaver, and seven children were born to them, namely: Ray L., who is commercial salesman for a large hardware house, resides at Tiffin, O., and married Florence, daughter of Isaac Whetstone, of Findlay; Bessie, who died when aged but four months; Blanche, whose death occurred in 1906, was a graduate of the McComb High School and was the wife of Clyde Rockwell, of North Baltimore, O.; Charles E., who has resided in San Francisco some years, married Lillie Oke of that city; Boyd F., who was educated in the McComb High School and the Yocum Business College at Findlay, is assistant deputy in the office of the treasurer of Hancock County; Sue, who is a graduate of the McComb High School: and Helen, who is yet a student. Mr. Martin is a member of the lodge of F. & A. M., at Deshler, of the Odd Fellows at McComb and of the Elks at Findlay. In politics he is a Democrat.

JOHN C. TRITCH, M. D., one of Findlay's eminent physicians, with well appointed offices in the Gray and Patterson Block, at Findlay, O., was born in this city, September 25, 1857, and is a son of Parlee C. and Nancy (Shong) Tritch.

Parlee C. Tritch, who is an esteemed retired citizen of Findlay, for many years was prominent both in business and politics. He conducted a harnessmaking establishment for a long period and was an active and useful citizen of both city and county, serving the latter as sheriff from 1876 until 1880. His wife survived until 1909.

John C. Tritch was reared at Findlay, where he attended the grammar schools and the High School, graduating from the latter in the class of 1874. During the succeeding winter he taught a country school and then began the study of medicine under the late Dr. W. M. Detwiler, and from his instruction entered the Homeopathic Medical College at Cleveland, O., being graduated there in 1878. His field of labor has been Findlay and environs but his professional skill has extended his reputation far beyond this environment. He has been a delegate to the Ohio State Medical Society, is ex-president of the Hancock County Medical Society and is also a member of the American Medical Association and a valued contributor to medical literature. Aside from his profession he has the interests of a well read, cultivated man. For some years he has been making a collection of Indian relics together with curiosities from all parts of the world and the greater number of these he has generously donated to the Findlay High School.

Dr. Tritch married Miss Lydia Wolf, a daughter of Levi Wolf, who was a soldier in the Civil War and one of its martyrs, dying at Cincinnati while on his way home. Dr. and Mrs. Tritch have two daughters: Mary Gail and Martha Agnes. The former is a graduate of the Findlay High School and of Smith College, and is teacher of Latin in the former institution. The younger daughter is a student in the sophomore year in the Findlay High School. Dr. Tritch is affiliated fraternally



JOHN C. TRITCH, M. D.

with the Masons, the Elks and the Odd Fellows.

NORMAN L. MacLACHLAN, M. D., was born in East Williams, Middlesex County, Ontario, Canada, November 26, 1854. His parents were Alexander and Mary (Black) MacLachlan, and he is a grandson of Donald MacLachlan, of Argyleshire, Scotland. Donald married Agnes McFarlane, and Alexander was their eighth child.

Alexander MacLachlan was born in Ardrishaig, Argyleshire, June 9, 1809. In 1840 he emigrated to Canada, settling in East Williams, Ontario, where he engaged in farming until May, 1861, when he removed to Argyle, Sanilac County, Michigan, where he died in 1879. His wife had died five years before. By his wife Mary, who was a daughter of John Black, a native of Glasgow, Scotland, and a gauger by occupation, he had a family of ten children, all of whom are living except the youngest, who died in childhood.

Norman L. MacLachlan, a child of six years when his parents removed to Argyle, Michigan, remained there up to the age of twenty, making the best of the educational opportunities to be had in a comparatively undeveloped region. At the early age of fourteen he worked in the lumber camps in winter and attended school and worked on the farm in summer.

Dr. MacLachlan began his medical studies in 1874, under the direction of Dr. William H. Greene, at Cass City, Michigan, in whose office he remained a year. He then entered the medical department of the University of Michigan at Ann Arbor, Michigan, from which he was graduated March 27, 1878. The practice of his profession was begun at Cass City, and he remained there eleven years. He was mayor of Cass City in 1883, and was re-elected in 1884.

A few years later—in 1889—Dr. MacLachlan came to Findlay where he has since been engaged in practice. He was surgeon to the Findlay City Hospital for several years and for many years has been surgeon to the C. H. & D. and the F. Ft. W. & W. Railroad companies. In October, 1897, President McKinley appointed him a member of the Board of U. S. Pension Examining Surgeons, and he was subsequently elected secretary of the Board. He is a member of the American Medical Association, Northwestern Ohio Medical Association, Ohio State Medical Society, and the Hancock County Medical Society, having served both as president and vice-president of the last named.

Politically Dr. MacLachlan is a staunch Republican and has taken an active part in the affairs of the city, county and state. He has never been an office seeker, but ever anxious and willing to aid his party and friends, and advance their interests, and more than one can testify to his ability as a political manager. From 1892 until 1898 he was a member of the City Council, serving as president for two years. He was a member of the Board of Education several terms. Has served as chairman of the Republican County Executive Committee, and is at present a member of the State Republican Executive Committee.

For many years Dr. MacLachlan, in addition to his practice, has been engaged in banking and manufacturing. He has been a director of the Commercial Bank and Savings Company since it was organized, and for several years he has been president of The Buckeye Traction Ditcher Company, The Findlay Publishing Company, The Findlay Sucker Rod Company of Findlay, O., and is a director in the Vanlue Banking Company of Vanlue, O.

He is a Mason and an Odd Fellow, having passed all the chairs in the latter order.

Dr. MacLachlan was married November 27, 1878, in Blenheim, Ontario, to Miss Emma Jackson, who died June 12, 1907. She was a daughter of John Jackson of Blenheim, Ontario. They have one child, Ethel May, who was married July 17, 1909, to Herman W. MacPhail, a banker of Raymond, Washington, where they reside.

SYLVESTER RHINEHAMMER, who owns 160 acres of valuable farm land, situated in Section 34, Marion Township, Hancock County, O., was born in Luzerne County, Pa., April 20, 1837, and is a son of Daniel and Ann (Syms) Rhinehammer.

Daniel Rhinehammer was born in Holland and he left his home on the Zuyder Zee after he reached manhood and after coming to America found farm work and married Ann Syms, in Luzerne County, Pa., and lived there until their fourth child, Sylvester, was three years old. They then came to Hancock County, O., buying a farm in Jackson Township, which they sold when they moved to Marion Township and bought a farm just east of the one on which their son Sylvester lives. The father died there but the mother had died previously while visiting at the home of her daughter, Amanda, in Michigan. They had the following children: Rachel, deceased, who was the wife of Elias Powell; Edward, who died while serving in the Civil War as a member of the 57th O. Vol. Inf.; Reuben, who is deceased; Slyvester; Nelson and Simon, both of whom were soldiers with their brother Edward, in the 57th O. Vol. Inf., and all died in the army; Amanda; Elmer; and several who died young.

In 1840, the parents of Sylvester Rhinehammer came to Hancock County and probably he was the most carefully protected piece of property as he was then only a babe of three years. A one-horse wagon transported the family and their household goods and Mr. Rhinehammer easily recalls the round log house which was the family home. He had but meager school advantages as he soon had to help in the clearing and improving of the farm, the hardest kind of toil being necessary from every member of the family. He remained with his parents until he reached the age of twenty-one years, after which he worked around among the neighboring farmers for some fifteen years. At that time a salary of $12 per month and board was considered very satisfactory. He then decided to work for himself, prudently renting land at first and then purchasing and selling until he secured enough capital to invest where he desired. For many years he has engaged successfully in farming and raising stock and his son Benjamin is associated with him and in late years carries the most of the responsibility. He has made many improvements here, rebuilding almost entirely the brick residence of nine rooms and erecting barns and other farm buildings as needed.

In October, 1869, Mr. Rhinehammer was married to Miss Margaret J. Searfoss, a daughter of Jacob and Jane (Powell) Searfoss. She was born in Marion Township, Hancock County, O., her parents having come early from Pennsylvania. To Mr. and Mrs. Rhinehammer four children were born, namely: John W., who is deceased; Benjamin, who operates the home farm, was born here May 23, 1873; Julius, who died at the age of nineteen years; and one that died an infant. Mr. Rhinehammer and son are Democrats. He has never accepted any office except that of school director. Both father and son are among the most reliable and respected men of this section.

JOSEPH BENSON CLAYTON, who is better known as "Uncle Bens," is one of the most prominent and widely known citizens of Hancock County, O., and resides in the village of Van Buren, in Allen Township. He was born December 30, 1833, at Sharpsburg, Washington County, Md., and is a son of Joseph and Louisa (Showman) Clayton, and a grandson of Henry Clayton who fought in the War of the Revolution. Joseph Clayton, an uncle of our subject, enlisted as a drummer boy in the War of 1812, also fought in the Mexican War, and three brothers of our subject served in the Civil War. Joseph Clayton, father of Joseph B. Clayton, was born and reared in Sharpsburg, Md., and was exceptionally well educated, being a fine mathematician, as well as a surveyor, civil engineer and school teacher. In about 1836 or 1837, with his family he removed from Maryland to Rushville, O., and there he and wife spent the remainder of their lives.

Joseph Benson Clayton spent his boyhood days in Rushville, O., and at the age of fifteen years began learning the plasterer's trade, which he followed successfully for forty-six years. When a young man he came to Van Buren, O., and for fifty-four years, with the exception of five years spent in Fairfield County, has been a resident of this village. In 1856, when he came to Van Buren, Mr. Clayton was not only without money but in debt, but began working at his trade as a plasterer, and in connection with his trade, dealt largely in real estate, buying and selling farm lands, and often acted as advisor for others, who were transacting real estate deals, and proved himself a man of splendid business judgment. During his early life Mr. Clayton traveled extensively, and has visited nearly every state in the union east of the Mississippi, and also Texas. He is a very interesting and entertaining conversationalist, and is held in high esteem by a large circle of friends and acquaintances throughout the county. In 1903, Mr. Clayton sold his farm of 100 acres, which was located in the northwestern part of Allen Township, and although he has owned various farms has never lived on any of them.

Mr. Clayton was married shortly after coming to Hancock County, to Caroline Myers, who is a daughter of Jonathan Myers, formerly of Bloomdale, Wood County, O. Four children have been born to Mr. and Mrs. Clayton: Willis Melville, who graduated in the classical course at the Ohio Wesleyan University, teaches the higher branches in the High School at Santa Anna, Calif.; Louisa, who is the wife of James V. Bushong, who operates a farm of 120 acres in Van Buren Township; Charlotte, who manages the home for her parents since her mother suffered a stroke of paralysis in 1907; and Georgiana, who died aged 20 years. Mr. Clayton affiliates with the I. O. O. F. and his religious connection is with the M. E. church, although he has always been a liberal supporter of churches of all denominations.

HON. SILAS E. HURIN, presiding judge of the Circuit Court of the Third Judicial Circuit of Ohio, was born December 22, 1858, at Cincinnati, O. He attended the public schools of Cincinnati and Wyoming, O., and was graduated from Princeton in 1882. After Princeton he taught one year in Morris Academy, at Morristown, New Jersey. In 1885 he was graduated from the Cincinnati Law School and was admitted to the bar. He came to Findlay, O., in 1887. In November, 1904, he was elected judge of the Circuit Court and has served on the Circuit Court since February 9, 1905.

H. MOLDER & SONS, general turnpike contractors, and owners of 197 acres of valuable land in Section 24, Orange Township, Hancock County, O., are representative citizens of this part of the county. H. Molder was born in Lorain County, O., August 15, 1845, and obtained his schooling there. After his marriage he settled on his present farm in Orange Township, Hancock County, where he operated a saw-mill for a number of years.

In 1902, Mr. Molder went into turnpike road contracting and did his first work in this line in Orange Township. He showed his business capacity and good judgment by providing himself with all the equipments necessary to do satisfactory work in this line, including a stone crusher and roller and all the particular tools required in this class of work. He has done a large amount of turnpike contracting over the county, working under the firm name of H. Molder & Sons, and has the well-won reputation of being the most competent man in his line of work in the county. He owns one team and gives employment to fifteen men, overseeing all the work himself. He also carries on extensive farming operations.

Mr. Molder married Miss Louisa Kramer, a daughter of Daniel Kramer, of Union Township, Hancock County, and they have five children: Melvin, Allen, Frank, Augusta and Inez. Two of the sons, Allen and Frank, are in partnership with their father and all are enterprising and successful business men. Mr. Molder and sons are Democrats.

E. LESLIE E. MUMMA, attorney at law at McComb, O., is a prominent member of the Hancock County bar and for forty years has been a political factor in the Republican party in the State of Ohio. He was born in Monroe Township, Allen County, O., April 8, 1854, and is a son of Peter K. and Susan (Montz) Mumma.

Peter K. Mumma was born in Lancaster County, Pa., July 19, 1819, and was of Swiss and French ancestry. His father, Peter Mumma, came to America from Alsace Lorraine, then a French province, following the close of the War of 1812. He lived in Lancaster and Susquehanna Counties, in Pennsylvania, and owned a distillery on the Susquehanna River. He died in 1839. His widow, also a native of France, died in Lancaster County, Pa., in 1866. They had the following children: John, Peter K., Eliza, David R., Joseph H., and Mary A. John Mumma was an engineer on the first line of the Pennsylvania Railroad. Eliza married David Castle, of Lancaster County. David R. Mumma became a man of much prominence in Pennsylvania and was sent to the State Senate from

Dauphin County and gave hearty support to the old political war-horse, Hon. Simon Cameron. He died at Harrisburg. Joseph H. Mumma came to Ohio in 1860 and lived in Hancock County during the remainder of his life until prior to his death, in 1908, which occurred at Payne, in Paulding County. He was a miller by trade. Mary A., the sixth member of the family and the only survivor, resides on a farm near Payne, O., and is now in her seventy-seventh year. She married Samuel Wiltsie, who was born in 1827, in Otsego County, N. Y. He was a soldier in the Mexican War, serving under the late Gen. Joseph E. Johnson, who later was an officer in the Confederate army during the War of the Rebellion. He has been a resident of Paulding County since 1862 and is now in his eighty-third year.

Peter K. Mumma was not a collegian but he was a scholarly and educated man, reading Latin, Greek and French, also German and being particularly proficient in his ancestral tongue and easily conversed in the dialects of his land. He was a strong man both mentally and physically. He was one of the original Abolitionists and was associated in the anti-slavery movement with Joshua R. Giddings and Benjamin F. Wade and his home was one of the stations of the underground railroad, in the late fifties. This was one of the burning questions of the day at that time and the leaders in the abolition movement suffered in many ways as they promulgated their principles. In 1838 he was married in Lancaster County, Pa., and in 1840 came to Allen County, O., locating on Riley Creek, a mile and a half from Bluffton, where he built a log cabin. In 1859 he removed to Orange Township, in Hancock County, not far from Bluffton in another direction. The land he secured was covered with a heavy growth of oak and the forest was yet full of game and many Indians still remained in the neighborhood.

Peter K. Mumma was married in 1838 to Susan Montz, who was born in 1822, in Maryland. Her father was Joshua Montz, a native of France and an emigrant to Maryland. After he died his widow married Daniel Odenwelder, a Moravian, and they came to Allen County and settled on Riley Creek in 1832. He was a noted hunter and a typical pioneer and his wife was no less courageous and resourceful. He died in Jo Daviess County, Ill. After the death of Mr. Odenwelder, the grandmother of Mr. Mumma crossed the plains to California with an ox-team and lived for ten years at Sacramento City, Calif. In the meanwhile the Pacific Railroad had been constructed and after she was 100 years old she decided to return east, boarded a train eager for the new experience and safely reached Whitely County, Ind., where she died four years later. Her passing was peaceful, and she was found sitting in her easy chair, with her open Bible which she had been able to read without the use of glasses. In many ways she was a remarkable woman. In earlier years she lived in Ohio when her nearest neighbors were at Fort Findlay, sixteen miles distant and when she visited them, on horseback, she carried her gun with her and was entirely fearless. The cabin in which she lived in Allen County, stood until 1905 and was a place of pilgrimage for her grandchildren.

To Peter K. Mumma and wife the following children were born: William J., Susan O., Joseph M., Zachariah Taylor, E. Leslie E., Simon G., Isaac N., Martha L., Mary E. and Roy Edmund. William J. Mumma was a member of Co. B, 99th O. Vol. Inf., and served through the Civil War and was wounded at Stone River, but later went with Sherman to the sea He married Mary H. Reeber, of Hancock County, later engaged in farming near Warsaw, Ind., where he died. Susan O. is the widow of James C. Bogart, who died at Bluffton, in 1905. Joseph M. follows the carpenter trade at Bluffton, O. He married Euphemia Hamilton, a daughter of Jonathan Hamilton, a pioneer of Hancock County. Zachariah Taylor, who is engaged in the mercantile business at Bluffton, O., married Amanda Hamilton. Simon G. Mumma has his home at Jamestown, N. D. He is traveling representative of the Rock Island Plow Company, their general agent and a fine business man. He is a 32nd degree Mason and a Shriner. He has been twice married. Isaac N. Mumma is a farmer and plasterer, residing in Auglaize County, O. He married Elizabeth Johnson of Hancock County. Martha L. is the wife of Joseph Bowen, of Warsaw, Ind. Mary E. died unmarried at Tecumseh, Nebr. Roy Edmund is engaged in the mercantile business in Paulding County, O. He married Bertha Miller. The father of the above family died July 7, 1897, at Bluffton, O., and the mother also passed away there. They were members of the Disciples church.

E. Leslie E. Mumma attended the public schools and after his High School course at Bluffton, entered Lebanon College and later was a student in the Ohio Northern University at Ada. In 1874 he became superintendent of public instruction in his home town and for a number of years made educational work his profession. For seven years he had charge of the schools of Vanlue, Hancock County, and for three years was at Benton Ridge. In association with Prof. Zellers he conducted a Normal School at Findlay. He read law with Judge Burgett, who became chief justice of the Supreme Court of Ohio. In December, 1882, Mr. Mumma was admitted to the bar by the Supreme Court and for twenty years he engaged in practice at Findlay, being subsequently admitted to practice in the United States Circuit and District Courts. In addition to attending to what has always been a heavy practice, Mr. Mumma has been active in political matters and by tongue and pen has worked effectively for his party, for forty years being a favorite campaign orator. He has been a resident of McComb, O., for the past seven years.

On October 22, 1876, Mr. Mumma was married to Miss Sarah A. Waltz, of Tuscarawas County, O., and they have four children: Morton C., Cliffe, Hiram Paul and Harlan Leslie. Morton C. Mumma was born March 8, 1878. He is a graduate of the Findlay High School and of the West Point Military Academy, in the class of 1900, where he gained honors in several lines. He at present is commandant of the State University of Iowa. He married a daughter of Alexander A. Zugsworth, of Findlay, and they have three children: Morton C., Jr., who was born in the city of Manila, P. I.; Albert Gerard, who was born at Findlay; and Martha, who was born in Iowa. Col. Mumma is a member of the staff of the governor of Iowa and is judge advocate for the Northwestern States. Cliffe Mumma is the wife of Capt. Holcomb, of the 10th U. S. Cav., who is commandant of the Ohio N. W. University at Ada. He is a graduate of Orchard Lake Military Academy and of the Bay City High School, of Bay City, Mich. He served in the Spanish-American war and spent two years in the Philippine Islands and has traveled over a large portion of the world. His father, Cole F. Holcomb was a hardware merchant. His mother was a graduate of Vassar College and her mother married Lord Hamersley, a son of the Lord Mayor of England and a member of the English Parliament. Capt. and Mrs. Holcomb have four children: Leslie Page, who was born at Fort Logan, Col., in 1901; Freeborn Page, who was born on the Island of Jolo, in the Philippine group; Cornelius Cole, who was born at Walla Walla, Wash.; and Jack, who was born at McComb. Hiram Paul Mumma was born at Vanlue, O., April 20, 1882, and is a graduate of the Findlay High School. He has been a resident of California for five years and holds a responsible position in the Riverside postoffice. He married Flora Bright, a daughter of J. C. Bright, of McComb, and they have one daughter, Corinne, who was born in her grandfather's home, five years ago. Harlan Leslie Mumma was born at Findlay, O., December 6, 1894. He is a student in the Northwestern University at Ada preparatory to entering West Point Military Academy.

Mr. Mumma has been a member of Mt. Blanchard Lodge, No. 519, F. & A. M., for thirty years, and Findlay Chapter, No. 58, R. A. M. Mrs. Mumma is a member of the Presbyterian church.

HERBERT V. BEARDSLEY, M. D., a thoroughly representative citizen of the city of Findlay, O., where he was born in 1859, occupies a prominent place in the medical profession but has never permitted its demands to entirely absorb him, having always given liberally of his time to further the higher social and civic aims of the community. The parents of Dr. Beardsley were Daniel Bailey and Jane (Summers) Beardsley, and his grandparents were Barney and Anna Beardsley.

Daniel Bailey Beardsley was one of Hancock County's able and influential men. His "History of Hancock County" is a valuable work and on account of its accuracy, together with its interesting reminiscences, gathered through a long and busy life-time, is found in many Hancock County libraries. He was born in Licking County, O., in 1832, and was brought to Hancock County when two years old by his parents. He taught school at Findlay in early manhood and then read law with a prominent law firm at Bellefontaine, O., and in 1856 was admitted to the bar. Among the many offices he held in city and county, was that of justice of the peace at Findlay. He served as a collector of internal revenue after the Civil War. He was identified with the Masons and other fraternal orders and took a very active part in politics. On May 22, 1856, he was married to Jane Summers and they had one son and four daughters. He died at Findlay, September 29, 1894.

Herbert V. Beardsley went from the public schools of Findlay to Oberlin College, where he remained through the freshman and sophomore years, and then took a course at Cornell College, at Ithaca, N. Y. He then turned all his energies in the direction of the study of medicine and was graduated from the Homeopathic College of Cleveland, in 1883. For sixteen months he practiced his profession at Ada, O., and then came back to his native city which has remained the chosen field of his efforts until the present. In his profession he has more than met success and in the leading medical organizations of the country his name is held in esteem on account of his ability.

Dr. Beardsley was married in 1886, to Miss Harriet Farrell, who died in 1896, survived by four children: John D., Frances E., Ruth A. and Geraldine. In 1898, Dr. Beardsley was married for a second time, to Miss Laura B. Morehead, who died in 1903 survived by two children: Edith N. and Girard G. In 1906 Dr. Beardsley was married to Caroline Schulenberg, of St. Marys, O. The handsome family home is situated at No. 223 Center Street, Findlay.

For many years Dr. Beardsley has been an important factor in Hancock County politics and has many times served as a delegate to the State, Judicial and Congressional conventions of the Republican party. His political aspirations, however, have been along very moderate lines—the few offices he has been willing to accept being those in which he has recognized that he could best promote the progress of his city and the general welfare of the largest number. He is a member of and an official in a number of the fraternal and beneficiary orders of the country and is frequently sent as a representative to their annual councils.

WILLIAM WHITFIELD WYER, who owns 217 acres of fine farm land all situated in Hancock County, O., resides on a tract of 100 acres of this, located in Section 27, Marion Township, the other 117 acres being in Section 12, Amanda Township. He was born in Fairfield County, O., January 29, 1851, and is a son of Henry and Anna E. (Ashbaugh) Wyer.

Henry Wyer was born in New Jersey and was a son of John Wyer who brought his family to Fairfield County but three years later moved to Iowa, accompanied by the most of his descendants and all of those who moved to the West died there. Henry Wyer and wife had seven children: Peter, John, Abraham, William, Henry, Margaret and Mary Ann. Henry Wyer did not accompany the other members of the family to Iowa, remaining in Fairfield County, where he was married to Anna E. Ashbaugh. She was born there and was a daughter of Fred Ashbaugh, who was a well known early settler. In 1867, accompanied by his family, Henry Wyer came to Hancock County, previously selling his farm near Wapakoneta. With this money he bought a farm which was then situated in old Findlay Township, now Marion. This was the old Samuel Switzer farm of 160 acres, which had been partly cleared. Henry Wyer bought, at different times, some 1,000 acres and as he possessed excellent judgment, it was all desirable property. He subsequently divided it among his children. He had prospered through farming and stock raising, never speculating in his life. He was born in 1828 and died in Marion Township in June, 1904. His widow still survives and makes her home with her son, Sherman Wyer, in Marion Township. Of the ten children born to Henry and Anna E. Wyer, William W. was the eldest. The record of the others is as follows: Emeretta, who died young; John; Alice, who is the wife of George Snyder; Anna Mary, who is the wife of John Hall; Sherman; Laura, who is the wife of O. Foster; Calvin G., and two who died young.

William W. Wyer went to the country

COL. JAMES A. BOPE

schools when young but began to help his father as soon as his strength permitted and remained at home until he was twenty-eight years of age. He has made farming and stock raising his business and has been more than usually successful in promoting these industries. His home farm was formerly known as the old Perry Lee farm. Mr. Wyer has done practically all of the improving here, putting up all of the substantial buildings except the residence. It is well tiled and substantially fenced, this work also having been done by the present owner.

Mr. Wyer was married March 22, 1879, to Miss Susan E. Hagerman who was born in Pennsylvania and is a daughter of Mahlan and Catherine (Wideman) Hagerman. Four children were born to this union, namely: Jessie May, who died aged two years; Stella, who is the wife of Clarence Knight, who operates Mr. Wyer's Amanda Township farm, and they have two children —Arthur Earl and Hazel Irene; Mahlan Zell, who is his father's farmer, married Lottie Loy; and Alice Catherine, who is the wife of Roland D. Foreman, of Eagle Township, and they have one child, Evelyn Ellen. Mr. Wyer and family are members of the United Brethren church. In politics he is a Republican but is no office seeker.

COL. JAMES A. BOPE, for many years was a representative member of the Hancock County bar, eminent in all lines of practice but especially so in railroad and corporation law. His military title was not one of mere compliment, but was valiantly won on the field of battle during his prolonged term of service in the Civil War. Colonel Bope was born at Winchester, Adams County, Ohio, November 30, 1832, and died at Findlay, October 25, 1908.

In 1838 the parents of our subject moved to Lancaster, Ohio, which place remained his home until 1859, when he settled permanently at Findlay. In 1857 he was admitted to the bar and immediately entered into practice, his ability in his chosen profession meeting with instant recognition. In 1862, however, notwithstanding the bright professional future that was then practically assured to him, he put aside his personal ambition and offered his services to his country. Enlisting in Company D, 99th O. Vol. Inf., he was made captain, and served in this capacity until July, 1864, when he was appointed acting inspector-general in Col. P. T. Swaine's brigade. At the head of his command in every time of danger, Captain Bope was frequently wounded but never seriously until the battle of Atlanta, from which field he was sent home by the late General Schofield, who never expected him to survive his injuries. In this supposition the veteran soldier was mistaken, for the young officer, spurred on by ambition and love of country, after some months, rejoined his regiment, that was then operating in North Carolina. Commissioned a lieutenant-colonel, he was then placed in command of the 99th and 50th consolidated regiments of Ohio Volunteer Infantry and served as such until he was mustered out of the army, in July, 1865. He participated in some of the most important of that long line of battles that left a trail of mourning over both North and South, and that even yet, after the passage of more than forty-five peaceful years, arouse patriotic emotion when they are recalled; among them, Perryville, Chickamauga, Lookout Mountain, and Missionary Ridge.

To have performed a hero's part in such a mighty conflict might have sufficed to confer enough distinction upon a young man to last a lifetime, but Colonel Bope came home from the wars to win equal prominence in a profession he loved, and one for which he was eminently fitted—that of the law. In political preference he was a Republican but from his party he sought no honors, the only public position he ever accepted being that of prosecuting attorney of Hancock County, the duties of which office he was performing at the time of his enlistment in the army. He was not a general practitioner, having early eliminated criminal cases from his line of professional work. His mind was analytical, deliberate and cautious, making him a safe counselor, and thus he was of inestimable value to great corporations in his state, large financial institutions, and important combinations of both public and private capital. For a number of years he was attorney for some of the leading railroad companies of Ohio, and for some years also served the city council of Findlay in the same position. As a citizen he was honored and esteemed; as a man he was respected and beloved. At different times he had business interests aside from his profession, and at the time of his death he was a member of the directing board of the First National Bank of Findlay. His life forms an inseparable part of the history of the city in some of its most important phases of development.

In 1861 Colonel Bope was married to Miss Martha J. Meeks, a daughter of Rev. J. A. Meeks. Their son, Edward V. Bope, who is one of Findlay's prominent attorneys, retains his father's old office at No. 322½ Main Street. He is a graduate of Kenyon College, of the class of 1885, and of the University of Michigan, in 1887, in which year he was admitted to the bar. He married Miss Laila M. Ernest, a daughter of Jacob Ernest, of Fostoria, and they have one son, James A. They reside at No. 128 East Hardin Street.

FRANK ARCHER, one of Portage Township's most respected citizens and an honored veteran of the Civil War, in partnership with his two sons owns 140 acres of valuable land here, which is divided into three farms. Mr. Archer was born in Bloom Township, Wood County, O., March 1, 1841, and is a son of James and Nancy (Copus) Archer.

James Archer came to Wood County, O., from Ashland County and died there when his son Frank was four and one-half years old. His widow survived him for many years, her death taking place in 1876, at the home of a daughter, Mrs. William Wall, in Portage Township, Hancock County.

Frank Archer grew to manhood in Wood County and obtained his education there. When the first call came for troops to preserve the Union, in April, 1861, he enlisted in Co. G, 21st O. Vol. Inf., and served for three months and then returned home and occupied himself in recruiting until the fall of 1862, when he re-enlisted in the same company and regiment and served faithfully until January, 1864, when he was honorably discharged on account of disability. He was attached to the 14th Army Corps, the Army of the Cumberland, and he participated in a number of the great battles of the war, including Stone River and Chickamauga.

After his military service was over, Mr. Archer returned to Hancock County and in 1865 settled on his present farm. When he took possession the land was yet in an uncleared condition and without improvements and it required years of hard work to transform it into the richly cultivated and productive fields of the present. Mr. Archer resides on one tract containing sixty acres, situated in Section 4, near District No. 5 schoolhouse; his son Forest occupies one farm adjacent to his own but situated in Section 3; while the third farm, also of forty acres, is occupied by his son Wallace and it lies in Section 9, all in Portage Township.

In 1874, Mr. Archer was married to Miss Cevnia Rader, who was born and reared near Van Buren, Hancock County, a daughter of David and Hannah Rader, and they have five children: Rhoda, who is the wife of William A. Black and they live in California and have two children—Merle and Harry; Wallace, who married Amy Lightfoot and they have two children—Agnes and Daniel Franklin; Forest, who married Emma McGee, and they have one daughter, Evalyn; Nellie, who married William Deter and they have two children—Thelma and Glenn; and Zella, who resides at home. Mr. and Mrs. Archer are members of the Brethren church.

ROSS WENTZ, who fills the responsible but very difficult position of superintendent of the Hancock County Poor Farm, is a native of Ohio and was born February 21, 1862, and is one of a family of thirteen children born to his parents who were Jacob C. and Jane (Michaels) Wentz, the former of whom died in 1891.

Ross Wentz was reared on his father's farm and obtained his education in the public schools. He continued to engage in agricultural pursuits until he was appointed to his present office, in March, 1909. Mr. Wentz has the superintendence of over 228 acres of land and under his methods and excellent management, this land goes far in providing for the support and maintenance of the sixty-seven public charges. His administration of the affairs of the farm has proved very satisfactory to the county commissioners.

On July 8, 1888, Mr. Wentz was married to Miss Carrie N. Bell, a daughter of James Bell, of Hancock County, and they have two children, Carl and Bertie P. Mr. and Mrs. Wentz are members of the Methodist Episcopal church. He is identified with the Odd Fellows and with the Democratic party.

WILLIAM KRICHBAUM, who resides in Setcion 7, Van Buren Township, Hancock County, O., on his valuable farm of 200 acres, is one of the representative agriculturists of this part of the county. He was born in Van Buren Township, October 15, 1870, and is a son of Peter and Catherine (Zearbaugh) Krichbaum. They were born in Germany and both came to Van Buren Township, where they married and still reside, with their son.

William Krichbaum was educated in a German school in Van Buren Township, after which he worked at farming. His father had taken up this land from the Government when he was a young man and owned 280 acres. For many years the father carried on farming and stock raising and his son continues these industries with a large amount of success. The buildings were all put up by the father. The land is in good condition and all but forty-five acres is well drained.

On January 9, 1907, Mr. Krichbaum was married to Miss Matilda Glick, a daughter of John and Mary (Marquart) Glick, and they have one little daughter, Clara Dora. Mr. Krichbaum, like his father, is a Democrat and has served as school director and once as supervisor. The family belongs to the German Lutheran church at Jenera, O.

JOHN W. GIBSON, who has been a resident of West Independence, O., since 1865, where he now lives retired, for many years was an active business man in Big Lick Township and other sections. He was born in Stark County, O., in 1837, a son of James and Sarah (Bowers) Gibson.

James Gibson was born in Pennsylvania in 1815 and died in Hancock County, O., in 1900. He married Sarah Bowers, who was born in Pennsylvania in 1799 and died in 1868. They had five children: John W., B. F., Mrs. Nancy Burk, Isaac and James Henry. James Gibson came to Hancock County and on May 2, 1839, took up government land in Section 36, Big Lick Township, which remained the family home.

John W. Gibson was two years old when he was brought to Big Lick Township and he grew up on the home farm and then learned the carpenter trade. He attended the school session held in the first log schoolhouse ever built in this township, this being in 1843. Mr. Gibson worked as a carpenter, later spent several years railroading and then operated a saw mill for a long time. In 1865 he came to West Independence and started the mill which is still operated by his son. In later years Mr. Gibson was interested in the threshing business and for some years operated his machine through the county. His different activities have made him well known to many people and in all sections of the county he has friends.

In 1860, Mr. Gibson was married to Miss Susan Bolander, of Putnam County, O., a daughter of Henry Bolander, and seven children were born to them, namely: John Fremont; David P., who conducts a store at West Independence; Emma, who married John Wynkoop, of West Alexander; Levi Wesley, who is proprietor of a clothing store at Fostoria, for a number of years was postmaster at West Independence; William, who operates the saw mill started by his father; and Milton E., who is a minister in the United Brethren church at Columbus Grove. Mr. Gibson has eleven grandchildren, as follows: Alberta, daughter of John Fremont; Clara and Oland, children of David P.; Floyd, Ralph, Fay and Allen, children of Emma; Reba, who is a daughter of William; and Lowell, Helen and Emerson, children of Milton E. They are all bright and intelligent and Mr. Gibson has great reason to take pride in his descendants. The family belongs to the United Brethren church at West Independence. In politics, Mr. Gibson is a Republican. He served acceptably for three years in the office of justice of the peace and for one year as constable. He is identified with both the Masons and Odd Fellows at West Independence.

RUFUS E. TAYLOR, capitalist and well known citizen of Findlay, where he owns a beautiful home at No. 207 Center Street, formerly and for many years, was closely identified with the oil interests of both Ohio and Pennsylvania. He was born June 6, 1859, in Geauga County, O. When thirteen years of age he left home and joined his older brother, E. C. Taylor, who was then conducting a store at Petrolia, in the center of the Pennsylvania oil fields.

That region, at that time, was a poor place for a lad of tender years and his brother soon sent him back to Ohio. To prove that he could be self-supporting, he worked for seven months on a farm in Lake County and then returned to Petrolia, where, when fifteen years of age he was earning a salary large enough to turn the head of any youth. When he left Petrolia a second time, his money had all been lost in oil speculation and he spent the next year hard at work in Connecticut. In the course of time the homing instinct took him back to Ohio, where he married and continued to reside for eighteen months and then spent six months in the oil business in Allegheny County, N. Y. In 1886, Mr. Taylor came to Findlay and with his experience in oil, was qualified as a desirable partner in oil enterprises, and shortly afterward became associated in this relation with H. A. Watts and E. C. Taylor. They formed a firm for the drilling of oil wells by contract and he continued with these partners until 1897, disposing of his interests after ten years of profitable work. During the following year Mr. Taylor enjoyed a period of travel and after he returned to Findlay was interested for several years in a local enterprise, from which he released himself in 1902. He is one of the city's capitalists, a state brought about through his own efforts, with no advantages in early life, either educational or social. He is a stockholder in the Commercial Banking & Savings Company of this city.

In 1880, Mr. Taylor was married to Miss Ella L. Leland, a daughter of William L. Leland. Politically he is a Republican and fraternally he is a 32nd degree Mason, an Odd Fellows, Elk and Knight of Pythias. Since possessed of capital, Mr. Taylor has been a generous citizen of Findlay and has been actively interested in her welfare, for one year serving very efficiently on the board of city improvements.

HON. CHARLES BRIGHT, a former member of the Ohio State Legislature, a veteran of the Civil War and the owner of 353 acres of valuable farm land in Section 16, Marion Township, Hancock County, O., belongs to one of the old pioneer families of Fairfield County. He was born in the log house that stood on his father's farm at that time, in Fairfield County, O., December 28, 1835. His parents were David and Leah (Arnold) Bright.

David Bright was born also in Fairfield County and was a son of David Bright, who was born in old Berks County, Pa., of German parents, who lived near Reading. Grandfather David Bright moved to Ohio in 1800, the land having been entered previous to that time. On that land David Bright the second grew to manhood, doing a large share of the clearing and developing. He was the second born in a family of five children, the others being: John, Mary, Sarah and Susan. He was twice married, first to Leah Arnold, who died in 1855, and his second wife was Susan Jessell, who survived him, his death occurring in 1889, when he was seventy-seven years of age. To his first union the following children were born: Charles; Samuel, who is deceased; Emily Jane, deceased, who was the wife of Adam Fisher, also deceased; James, who is deceased; Julia Ann, who is the wife of William Spangler; and two children who died in infancy. To the second union two sons were born: David L. and John. The latter still lives on the old homestead.

Charles Bright grew to manhood in Fairfield County and attended the district schools. In 1861 he enlisted for service in the Civil War, entering Co. F, 17th O. Vol. Inf., and remained in the army for three years and six weeks, at that time receiving his honorable discharge. He was a brave and ready soldier and gained promotion, bearing the rank of sergeant at the close of his service. He participated in many decisive battles of the great struggle, among these being: Corinth, Wild Cat Mountain, Hoover's Gap, Buzzard's Roost, Jonesboro and Chickamauga, at times being in the very center of danger but escaped injury, the nearest to it being when he discovered that two bullets at the battle of Chickamauga had been stopped in their probably otherwise fatal errand, by his knapsack.

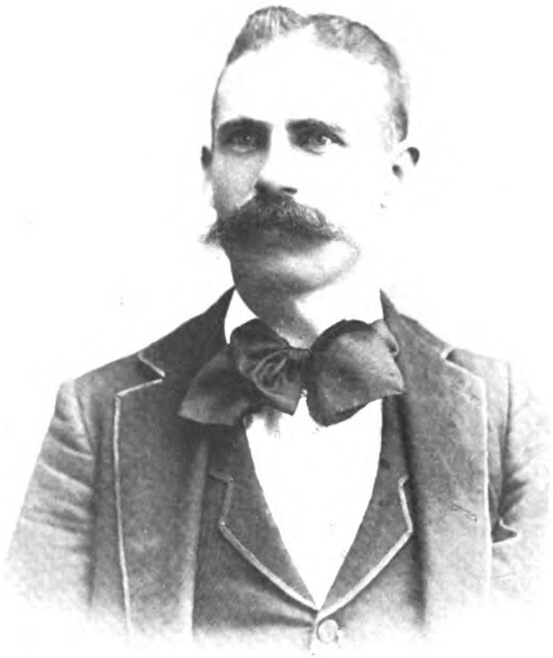
Mr. Bright returned then to Fairfield County and was married there on September 25, 1866, to Miss Catherine A. Carnes. In the following spring they moved to Hancock County and he first bought 157 acres of his present farm from the David Tussing heirs and later added the rest of the land. In 1886 he completed the erection of his commodious and comfortable brick residence. Until he retired from active labor, he followed farming and stock raising and these industries are still carried on by his son, David R.

Three children were born to Mr. and Mrs. Bright: John C., who is in the oil business; David R., who manages the farm, married Chloe Morehead, and they have one child, Marilyn; and Effie E., who is the wife of C. M. Wisely, of Findlay, and they have four children: Evelyn, Catherine, Ruth and Dorothy.

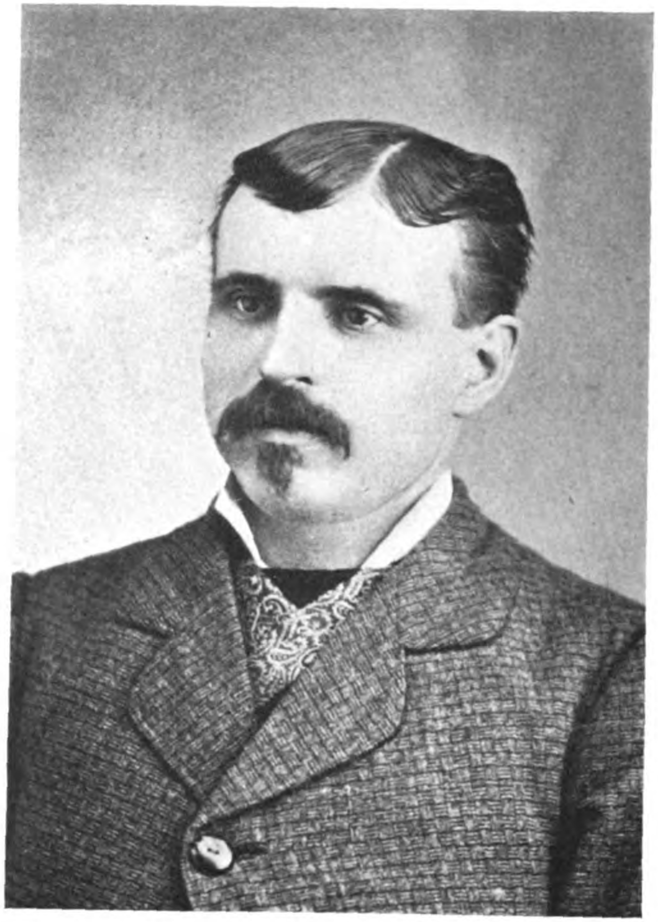
Mr. Bright has long been prominently identified with the Republican party, and in 1893 he was elected to the Legislature and served most acceptably during one term in that body.

RICHARD B. DEMING, a representative farmer and stock raiser of Portage Township, Hancock County, O., owns 240 acres of valuable land, separated into two adjoining farms, one of 160 acres, in Section 10, on which he resides, and one of eighty acres, in Section 15, just south of the larger farm. He is a native of Portage Township, born on a farm one-half mile from his present one, January 12, 1850, and is a son of Treat Deming and wife, both of whom died on their farm in Portage Township.

Richard B. Deming was reared and attended school in Portage Township and has been engaged in farming ever since old enough to use farm implements. After marriage he lived for some years in Allen Township but has resided on his present place for the past twenty-five years. He purchased the other farm in 1908 from the Samuel Culp heirs. Mr. Deming operates but eighty acres of his land himself, having the re-



JOHN C. FOLK



SAMUEL S. FOLK

mainder rented out to good tenants. He has made all the substantial improvements and the whole extent of his property would command a very high price if put upon the market, and its value increases each year.

Mr. Deming married Miss Amelia Ausenbaugh, a daughter of Isaac and Mary (Salmon) (Lyon) Ausenbaugh. The father of Mrs. Deming died in April, 1857, when she was a child. Her mother survived until 1904. Mr. and Mrs. Deming have two children: Daisy and Mary Adeline. Daisy married George Strouse and they have three children: Ethel, Ruth and Willard. Mr. Deming takes no very active part in politics but he has always been interested in educational matters and has served seven years as a member of the Portage Township School Board.

GEORGE PELTON JONES, cashier of the First National Bank of Findlay, O., is a man of exceeding prominence both in business and political life in this section of Ohio. He was born at Findlay, May 13, 1866, and is the only son of the late Elijah Pelton and Mellie (Johnson) Jones, the latter of whom survives.

George Pelton Jones grew to manhood in a cultured, refined home and its influences have been invaluable to him. He was carefully educated and after graduating from Williams College, in 1884, took a business course in a commercial college in New York and then returned home ready to begin a course of business training that commenced at the bottom of the ladder, his father insisting that he should enter his bank in a humble capacity and advance through merit alone. From messenger or runner he won his way to his present position, which he has filled since 1894. The First National Bank of Findlay, of which his late father was one of the organizers, and its president until his decease, in 1894, stands among the foremost financial institutions in the state and the conservative methods which marked its progress during the life of the late Elijah Pelton Jones, are in use in its present management. Mr. Jones is widely and favorably known as a financier and is president of the Ohio Bankers' Association. He has additional business interests. In his political views he has always been a stanch Republican but has been consistently averse to holding public office, his only exception having been a service of five years as a member of the city council, accepted as a friendly concession to his ward. He is a member of the fraternal order of Elks and since 1888 has been a Free Mason.

Mr. Jones was married on September 16, 1891, to Miss Cora Elizabeth Carr, whose father was a large glass manufacturer at Bellaire, O. They have one daughter, Gertrude, who was born August 24, 1892. Mr. and Mrs. Jones are members of the Episcopal church. Their beautiful home at No. 719 S. Main Street is frequently the scene of many society functions.

FOLK BROTHERS, manufacturers of office furniture, store fixtures, tables, counters household furniture, kitchen cabinets, etc., with offices and works at No. 402 East Sandusky Street, Findlay, O., have been partners in this business since November 15, 1888. The firm is composed of Samuel S. and John C. Folk, brothers. The former was born on a farm in Perry County, O., in a pioneer log house, September 13, 1852, and the latter was born at Findlay, O., at the family home, No. 351 South Blanchard Street, September 12, 1868. They are sons of George and Sarah Ann (Pence) Folk.

George Folk, the father, was a natural mechanic and he was equally at home as a blacksmith, a carpenter or cabinetmaker. His death occurred at Findlay, March 12, 1904. His widow survives and is in her seventy-eighth year. The Folk brothers have inherited their tastes for working in wood, this having been a family trait for generations of Folks. The maternal grandfather, Isaac Pence, was a soldier in the War of 1812 and later in the Mexican War. He was with Commodore Perry at the naval battle fought off Put-in-Bay Island and in this connection a very interesting bit of history may be recorded. Many of the older generation will remember the historical picture that was sure to attract their attention in their old geographies, which represented Commodore Perry and several of his men in a skiff, rowing from Perry's flag-ship to another vessel, during this battle, after the flag-ship had been destroyed. One of the rowers is shown with his head tied up and the original was Isaac Pence, who had been slightly injured and had tied a cloth across the wound. It was the intention of the artist to make the picture historically correct and he succeeded in doing so. Mr. Pence passed through Findlay as a soldier following the old Indian trail and assisted in the building of old Fort Findlay which stood on the west side of Main Street, just south of the bridge. Later in life, Mr. Pence went out as a soldier in the Mexican War.

The Folk brothers began business in a small way at the old family home place, No. 351 South Blanchard Street, where they remained until the completion of their factory on East Sandusky Street, in 1891. In 1901 they made extensive improvements, equipping their works with a full line of modern machinery. Both brothers are skilled mechanics themselves and they entrust their manufacturing only to those equally qualified, giving steady employment to from seven to twelve men. In the main they have been continuously prosperous although they have suffered some misfortunes, including robbery and destruction by fire. On the anniversary of the day of their starting into business they had their safe blown open and had the robbers made their visit on the day before they would have secured over $2,000, which the firm had deposited there. Fortunately this large sum had been removed and the loss aggregated only $15 in money and a trifle in postage stamps, not counting in the damage to the safe. In their second year of business they suffered from a fire. Both brothers are equally public spirited and show an interest in all that concerns the welfare of their city and county. They reside in adjoining houses on East Main Cross Street, the residence of Samuel S. Folk being at No. 500 and that of John C. Folk at No. 506.

Samuel C. Folk married Miss Lizzie A. Early, of Wood County, O., and they have one son, Fred R. John C. Folk married Miss Estella I. Grubb and they have five children: Gaylord A., Violet, Mildred, John and Martha Jennette. The brothers are members of the Modern Woodmen and Samuel S. is identified also with the Maccabees and the Red Men. Neither takes an undue part in politics but the responsibilities of citizenship are never shirked.

ALBERT SAMPSON, one of the substantial farmers and highly respected citizens of Jackson Township, Hancock County, O., was born February 18, 1855, near Baltimore, Md., and is a son of Hinkle Edward and Mary (Standiford) Sampson, both natives of Maryland.

Albert Sampson was reared in Jackson Township and obtained his educational training there. He has always followed farming and has one of the best improved farms in the township, having a fine brick house and barn, the former of which was erected in 1906, and the barn was built six years ago. Mr. Sampson is politically a Democrat, and has served as personal assessor and land appraiser. At present he is appraiser for the Mutual Insurance Company. He is a member and trustee of the M. E. church at Union Chapel, of which he has been a member for thirty years, and is also a trustee of the Cemetery association.

Mr. Sampson was married in 1881 to Lucy Hoy, who is a daughter of Abraham and Mary (Hellen) Hoy, who were well known residents of Hancock County, and of their union were born the following children: Edith M., marrid Wesley White, a drayman of Forrest, Ohio, and has one son, Waldo; Agnes R., married John C. Smith of Eagle Township, and is the mother of two children, Florence M. Smith, and Edson A. Smith; Frederick C.; Annie E.; Golda P.; Virgil, who attends school in Jackson Township.

N. D. DAVIS, a retired farmer and a highly respected citizen of Blanchard Township, was born on the place on which he lives, a valuable farm of 120 acres, October 5, 1844, and is a son of Alfred and Nancy (Houchens) Davis.

Alfred Davis was born in Cynthiana, Ky., and is said to have been a cousin to Jefferson Davis of Confederate fame. With his father, Alfred Davis came from Kentucky to Hancock County and had some school advantages. He was married the first time to Nancy Houchens and they had five children: Laura, N. D., Delilah, Lewis and Herman. After the death of his first wife he married Amanda Stough and they had two children: Nancy May, wife of Frank Robinson; and D. H. S. Alfred Davis entered the farm now owned by his son, N. D. Davis, at first in association with his brother whom he later bought out, and owned 160 acres in all. He became a successful farmer and gave his entire attention to farm pursuits. His death occurred here May 30, 1896, when aged eighty-one years and six months, and his burial was in Blanchard Township. His first wife died August 6, 1858, at the age of thirty-eight years. She was a faithful member of the Methodist Episcopal church.

N. D. Davis was reared in Blanchard Township and attended the district schools and then assisted his father on the home farm. After his own marriage he went to live in Putnam County, not far from McComb, and remained there until 1905, when he came to the old farm he now lives on and owns.

In September, 1869, Mr. Davis was married to Miss Annie E. Vangilder, who was born in Jefferson County, O., later living in Hancock County, and moving from here to Iowa where she was a school teacher. They had three children: Cora, Ora T., and Myrl C. Cora married B. R. Dukes and they have three children: Louis, Arlo and Doras. Ora T. married Blanche Nebeil and they live in Putnam County. Myrl C. is a student in a medical school at Cleveland. The mother of the above family died May 22, 1901, in the Robinwood

Hospital, at Toledo, O., and her burial was at McComb. She was a lady of Christian character and many virtues and was a member of the Presbyterian church. Since then Mr. Davis has united with the Methodist Episcopal church. In politics he is a Republican. He has always been a law abiding citizen but has never accepted any offices in Hancock County.

WALLACE DORSEY, one of Hancock County's well known citizens, has had large business interests here for many years and together with operating a farm of 160 acres, for some thirty years has been engaged in the manufacturing of drain tile. He was born in Allen Township, Hancock County, O., July 5, 1836, and is a son of William and Louisa (Bryan) Dorsey.

William Dorsey was born in Pennsylvania, May 14, 1804, and died September 3, 1886. In early manhood he came to Hancock County, O., and in April, 1835, he was married to Louisa Bryan, a native of Kentucky, who was born in 1811 and died in 1896. William Dorsey secured 160 acres of uncleared land from the Government, which he developed into a productive farm, and both he and wife spent their lives on that place, both fulfilling every duty which life presented to them. William Dorsey was one of the honest, reliable men of Allen Township, and frequently was called upon to serve in public office. His eight children were given the following names: Wallace, Elizabeth, William C., Amanda J., Cordelia, Edson, Winfield A., and Milton.

For twenty years of early manhood, Wallace Dorsey worked as a carpenter, contractor and builder, and through the excellence of this work gained a favorable reputation that extended all over Hancock County. In 1863 he purchased twenty acres of land, to which he subsequently added, and later settled on his property and devoted himself to its improvement. In 1877 he began the manufacture of drain tile and built up a large industry, equipping his plant with machinery that enabled him to make all sizes demanded by the trade. In this business as in other lines, Mr. Dorsey has always maintained the same honesty of effort that produces commodities which ensure the continuance of custom.

Mr. Dorsey was married (first) February 28, 1861, to Miss Lois Nelson, who was born in Ohio, January 10, 1829, and died September 13, 1897. They had the following children: Luella, Charles W., William W., Albert E., Elwood N., Lloyd W., Mary B., Homer O., and Milton L. Mr. Dorsey was married (second) January 28, 1902, to Mrs. Frances E. Bennett. They are members of the Methodist Episcopal church. In politics, Mr. Dorsey is a Democrat. He has never cared for public office, but when elected township trustee, served faithfully and acceptably.

Hon. Homer O. Dorsey, of the above family, is one of Hancock County's leading young men of affairs and is serving in the office of probate judge.

ANDREW JACKSON MOORE, who cultivates 160 acres of valuable farm land situated in Section 15, Big Lick Township, Hancock County, O., is a graduate of the Colorado State School of Mines and followed his profession for three years. He was born on this farm, January 11, 1873, and is a son of A. J. and a grandson of William Moore.

A. J. Moore, Sr., was born in Beaver County, Pa., in 1827, and came with his father, William Moore, to Hancock County. In 1853 he was married to Nancy Moore, who was born in Ashland County, O., and was brought to this township when she was three months old. Six children were born to them, namely: John F., who has four children—Calvin Lee, Clyde M., Frank Homer and Charles Brooks; William Carlton; Samuel A., who is deceased; Mary A., who married A. W. Lackey, of Morris County, Kan., and they have six children—Edith, Harry, Grover, Grace, Roy and George; Nancy Cassie, who married J. C. Martin, of Wayne County, Kan., and they have four children—Clinton, Lulu, Emery and Carl; and Andrew Jackson, subject of this sketch. The father of this family died in 1897 but the mother still survives and is in the enjoyment of health and has a wide circle of friends, a number of these of many years standing as she is well known in this section.

Andrew Jackson Moore was educated in the township schools. Following out a natural inclination, he then became a student of mining, at Lincoln, Neb., and later attended the Colorado State School of Mining, with the result mentioned above. Although Mr. Moore has a fine technical education in his chosen profession and successfully practiced it until 1901, he has also been very successful as a farmer.

Mr. Moore was married in 1907 to Miss Ida M. Roth, of Findlay. In politics he is a Democrat.

WILLIAM OLIVER LEEPER, a substantial resident of Jackson Township, who for a number of years has been actively identified with business and property interests in Hancock County, was born in Hardin County, O., Oct. 1, 1874, and at the present time is in the prime of a vigorous manhood. His parents were J. F. and Katie Leeper, the former now being a resident of Findlay. He, like his son, is a native of Hardin County and for a number of years was engaged in farming. He settled in Findlay about four years ago, and though somewhat advanced in years is a man still capable of much active exertion. His wife, the mother of the subject of this sketch, comes of a good Catholic family of Hardin County. She is still living and resides with her husband in Findlay.

William O. Leeper was reared in Hardin County and resided there until about fourteen years ago, at which time he came to Hancock County, settling in Jackson Township. In youth he was trained to agricultural pursuits and has been thus engaged much of the time since. His present farm in Jackson Township consists of 300 acres and is a well improved piece of farming property. Mr. Leeper has also had some experience in manufacturing industries, having been employed both in the tile and the target works, in all some seven years. By means of hard work and thrifty living he has attained to a comfortable degree of prosperity. He has invested to some extent in real estate and now owns good residence property on Washington Avenue, Findlay.

Mr. Leeper was married October 3, 1894, to Mary Elizabeth Phillips, a daughter of Joseph and Elmira (Wolfrum) Phillips, of Williamstown, in which place Mr. Leeper's parents both died. Of this marriage there have been the following children: Aloyda Adelbert, who attends school in Findlay;

Joseph Franklin, who died at the age of ten years; Guy Theodore and Albert Leroy, both of whom attend the Findlay schools; Lester D. and Ethel May, the last mentioned of whom died in infancy. Mr. Leeper is a member of the United Woodmen and the United American Mechanics. His political affiliations are with the Republican party but he takes no active part in politics beyond casting his vote.

HON. THEODORE TOTTEN, formerly mayor of Findlay, O., and now serving in his second term as postmaster, has been a prominent citizen here for many years and has been an active member of the Republican party in Hancock County, and at the same time has been a representative member of her bar. He was born on Staten Island, N. Y., January 1, 1848, and is one of a family of seven children born to his parents, who were William and Susan (Platt) Totten.

Theodore Totten was educated in the public schools and when only fifteen years old left home and enlisted in the United States Navy. Probably the fact that his father was a ship builder and the youth was more or less accustomed to hearing of life on the water in this connection, may have determined his choice of the branch of the service to which he attached himself, but the record shows that he was a brave if an unusually young sailor. He is identified with the Grand Army of the Republic.

In 1866, Mr. Totten came to Findlay and embarked in the cigar and tobacco business and later added to his duties and responsibilities by accepting the agency of the Western Union Telegraph Company, with which corporation he continued to be connected for twelve years. Although early circumstances had prevented his following his natural bent and entering into the law in early manhood, he was still sufficiently interested to pursue his legal studies by himself and in 1881 gained admittance to the bar. He engaged in the practice of law from then until 1904, in the meanwhile serving one term as prosecuting attorney of Hancock County and one term as mayor of the city of Findlay. In the above year he was first appointed postmaster and was reappointed in January, 1909. This office is systematically managed and the people of Findlay boast of its good service. In his assistant, Charles A. Saunders, Postmaster Totten has an able helper and he has under his direction and supervision twenty-four other employes, with all of whom his relations are most cordial.

Mr. Totten was married to Miss Melinda Porch, a daughter of Henry Porch. Their pleasant family home is situated at No. 208 First Street. Mr. and Mrs. Totten are members of the First Methodist Episcopal church. He is affiliated with a number of organizations and long has been a Free Mason.

IRVIN FETTERS, one of the successful farmers of Marion Township, Hancock County, O., where he owns 160 acres of valuable land, situated in Section 26, was born on a farm which is now included in the city of Findlay, O., February 22, 1855. His parents were Peter and Catherine (Philipps) Fetters.

Peter Fetters was born in Pennsylvania and after the death of his father he accompanied his mother when she removed to Hancock County, where she was subsequently married to a Mr. Fulk. Peter Fetters grew to manhood in this section and became a farmer in Eagle Township, where he owned the place on

LEONARD C. GLESSNER

which he died. Thirteen children were born to Peter and Catherine Fetters, as follows: Andrew, who is deceased, was a soldier in the Civil War; Elizabeth, who is deceased; Mary Ellen, deceased, who was the wife of Calvin Smith; Eli, who is deceased; Sarah, who is the wife of A. Bond; Isaiah; Irvin; Caroline, who is the wife of Jefferson Baker; Jane, who is the wife of Clayton Van Sant; Uriah; Criselda and Lemuel, both of whom are deceased; and Emma, who is the wife of Lewis Marchall. The venerable mother of this family still survives and her home is at Findlay.

Irvin Fetters remained at home until his marriage, having assisted his father after his school days were over in the old log schoolhouse, with its split log benches. He has devoted himself exclusively to farming and purchased his place from his father-in-law. He has made many improvements, in large degree follows modern methods of agriculture and owns excellent farm machinery. He married Miss Nora E. Bennett, a daughter of Rawson and Matilda (Cooper) Bennett, and they have five children: Aerie, Katie, Clark, Howard and Nelia. Mr. Fetters casts his vote with the Democratic party.

HARRY J. PARKER, who is engaged in general farming on a tract of eighty acres located on the Houcktown-Findlay road in Jackson Township, has been a lifelong resident of Hancock County, and was born April 4, 1876, at Vanlue, Hancock County, O., a son of Wilbur S. and Mary A. (Shuler) Parker. Wilbur S. Parker was also a native of Hancock County, and followed harness-making at Vanlue, where he was residing at the time of his death. His wife was a native of Pennsylvania.

Harry J. Parker was reared in Jackson Township and received his education in the schools of the district, and has always followed farming as an occupation. He purchased his present farm of eighty acres in 1905, from the William Doty estate. Mr. Parker is politically a Republican, and although never caring to hold office, is at present serving as township clerk. He has for twenty years been a member of the M. E. church at Houcktown.

In November, 1898, Mr. Parker was united in marriage with Letie Houck, who is a daughter of S. F. and Rebecca (Sampson) Houck, the former a resident of Houcktown, O., the latter being deceased. Mr. Parker is fraternally a member of the Maccabees, Lodge No. 197, at Findlay, and of Post No. 67, Sons of Veterans.

LEONARD C. GLESSNER, president of the Glessner Medicine Company, of Findlay, O., was born at Delaware, O., March 17, 1853, and is a son of Lewis Glessner, who conducted the Hancock Courier from 1861 until 1879. His mother was Georgiana (Cowles) Glessner, a granddaughter of Col. Moses Bixby, a Revolutionary soldier, who was one of the founders of the town of Delaware, O.

Leonard C. Glessner was only a boy when he accompanied his father to Findlay and he remained here until 1874. He learned the printing business in his father's office and upon leaving Findlay published newspapers at different points in Illinois and Missouri, until 1887, when he returned to Findlay, where he became city editor of the Courier. As a side issue, in 1889, he began the manufacture of medicine but in a short time this interest became paramount and he found it profitable to devote all his time to it. For twenty-one years he has been manufacturing the famous compound known as Dr. Drake's German Cough and Croup Remedy, which is considered a necessity in many households, trade being heavy all over the United States and in Mexico and Canada. While this remedy is probably best known the company also manufactures another which has no equal of its kind, this being Leonard's Sweet Worm Wafers. The present company was organized in 1905 and was then incorporated with a capital stock of $60,000. Its officers are: L. C. Glessner, president and general manager; Edward Schwartz, vice-president; Hon. A. E. Kerns, formerly probate judge, treasurer; and Lewis W. Glessner, secretary. In 1910, the Glessner Medicine Company took control of the Duke H. Watson Company, which was an old established concern manufacturing livestock remedies, making a specialty of the G. Be German Blemish Eradicator, which is used by horsemen all over the United States. The Glessner Company keeps from two to six men out on the road representing it. The company understands modern business methods and gives much attention to advertising. They own their own printing establishment which is used exclusively in their own business and is larger than any other printing house in Findlay. It is a fact that the Glessner Medicine Company sends out more advertising matter than any other two concerns in the city.

Mr. Glessner was married at Farmer City, Ill., to Miss Emma Chappelear, who was born in Missouri. At that time, Mr. Glessner was conducting a newspaper at Farmer City. They have three children: Lewis W., who is secretary of the Glessner Medicine Company; Harry C., who is also connected with the business; and Mary E. Mr. Glessner and family are members of the First Presbyterian church and he is president of its board of trustees. He is especially well known in Knights of Pythias circles, being a member of Findlay Lodge, No. 85, and since 1900 has been representative to the Grand Lodge and is a member of the finance committee of the latter body. Few citizens of Findlay are more enterprising or progressive and few are better known.

ISAAC DAVIS, one of Findlay's representative business citzens, who carries on a wool and seed business at No. 215 Park Place, is also the owner of many acres of some of the best oil and gas land in Hancock County. He was born in 1837, in Marion Township, Hancock County, O., and is a son of William and Margaret (Lafferty) Davis.

Henry Davis, the grandfather of Isaac Davis, was probably born in Wales. He was twice married, (first) to Margaret Craig, and (second) to Betsey Hammond. Seven children were born to the first union and five to the second. He seems to have settled in Maryland after coming to America and probably died there.

William Davis, father of Isaac, was born in Maryland. He came to Hancock County in 1832, accompanied by his wife, to whom he had been married in 1828. She survived him many years, being, at the time of her death, one of the oldest residents of Marion Township. They had ten children, the two surviving sons being: A. L., who is a practicing physician at Findlay; and Isaac, who has spent his life in Hancock County. William Davis was a man of consequence in this part of Ohio, not only on account of being one of the largest landowners, but also because of his sterling traits of character. Twice he served Hancock County as a commissioner, and for thirty-two consecutive years was a justice of the peace in Marion Township. He died in 1863.

Isaac Davis, whose landed possessions amount to some 600 acres, on which are valuable oil and gas wells, while one of Findlay's most substantial citizens, is one of the most unostentatious. For many years he has, in large measure, divided his attention between his agricultural affairs and his wool and seed business. Upon solicitation, he has, at times, accepted township offices, including that of justice of the peace, but he has cared little for political honors, finding himself sufficiently interested in looking after his private affairs.

In 1860, Mr. Davis was married to Miss Caroline Gifford, who was born in 1840, in Hancock County, O., on the farm which is now the summer home of the family. Mr. and Mrs. Davis have the following children: William, Florence, David T., George W., Gertrude and Henry. Howard V. is deceased. The family residence is situated at No. 214 Center Street, Findlay.

JOHN HENRY RIDDLEBAUGH, one of Marion Township's well known and highly respected citizens, carries on general farming and owns 195 acres of valuable land, situated in Section 25, not far distant from Findlay, O. He was born in Fairfield County, O., September 28, 1859, and is a son of Henry and Catherine (Shoemaker) Riddlebaugh.

Henry Riddlebaugh was born in Germany and on account of participating in the revolution of 1849, he was expelled with other revolutionists and came then to America. He located at Lancaster, in Fairfield County, O., where he followed the blacksmith trade during his active years. He still survives and in his long life of eighty-six years he has witnessed many wonderful changes, not only in his native land, but also in the one which he adopted. In 1856 he was married to Catherine Shoemaker, who was born in Pennsylvania and died in 1901, at the home of her son James, in Crawford County, O. The Shoemaker family came to Pennsylvania from Switzerland in 1742. Six children were born to Henry and Catherine Riddlebaugh, namely: Jacob, who lives in Crawford County; John Henry; James, who also lives in Crawford County; Theresa, who is the wife of John Snyder, of Hocking County, O.; Elizabeth, who is the wife of Charles Angle, of Hocking County; and Augustus, who resides at Columbus.

John Henry Riddlebaugh started out to take care of himself when he was twelve years old. He came to Hancock County and went to work for Charles Bright, with whom he remained for two years; worked then for George Wiseley, in Marion Township, for three years and for William Thomas for two years, and then went into Big Lick Township and worked one year for William Bright. He had been saving and by this time had enough capital to enable him to buy forty acres of land in Pleasant Township and later bought a second forty acres and sold the timber from both tracts. He then rented land for a short time, but in March, 1896, bought eighty-five acres of his present farm, purchasing from Charles Johnston; later bought thirty-five acres from Tolliver Jacobs; fifteen acres from A. Beard, and twenty acres from the A. Beard estate. To this was added forty acres which was given his wife. It is a fine thing to own 195 acres of valuable land, but it required much hard work to make a large part of it valuable. Mr. Riddlebaugh by his own toil cleared 100 acres of stumps, did all the necessary ditching and tiling, built his substantial barn and made the other improvements which have transformed what was once merely waiting soil into one of the richest farms and most comfortable homes of Marion Township.

On November 9, 1882, Mr. Riddlebaugh was married to Miss Elvira Wiseley, a daughter of Henry and Loraina (Wiseley) Wiseley, of Pleasant Township, and fourteen children have been born to them, the record being as follows: Iva, the eldest, is the wife of Edward Huntington, of Toledo, O. Ethel is the wife of Porter Shuck of Big Lick Township and they have one child, Pauline. The eldest son is his father's helper and bears the name of Ray. Howard lives at Toledo. He married Mattie Wescott. Earl, Paul, David, May, Alice and Doris, all live at home. Margaret died when aged three years and Lulu died when aged two months. Irma and Helen complete the list. All the children remaining at home who have reached school age are bright, intelligent students. The family belongs to the United Brethren church. In politics he is a Republican but has never consented to accept public offices, the care of his large farm and his other duties so far absorbing the most of his time. He is identified with the Masonic fraternity at Findlay.

SAMUEL C. DAILEY, who, since 1896, has been successfully operating a farm of 171 acres, which is situated in Section 3, Portage Township, Hancock County, O., was born on a farm in Cass Township, May 12, 1869, and is a son of Baker and Mahala (Fisher) Dailey.

Baker Dailey was born on a farm in Washington Township, Hancock County, O., November 14, 1839, and is a son of D. J. and Mary Elizabeth (Hale) Dailey. D. J. Dailey was born at Steubenville, O., in 1811 and came with his parents and other members of his family to Hancock County in 1825 and located in the centre of Washington Township. The wife of D. J. Dailey was born near Wheeling, now in West Virginia, in 1815, and came to Washington Township with her brother, Baker Hale, who entered 160 acres of land in Washington Township, in 1830. After her marriage, D. J. Dailey purchased eighty acres of this land and this continued to be their home. Baker Dailey was reared amidst pioneer surroundings but he was afforded much better educational advantages than were enjoyed by many, attending school at Findlay and Fostoria. When nineteen years of age he began to teach school and continued to teach for fifteen winters, engaging in farming in the summers. He still resides on his farm in Cass Township. On November 6, 1862, he was married to Mahala Fisher, who was born in Carroll County, O., January 9, 1840, and died in 1906.

Samuel C. Dailey was reared in Cass Township and attended the local schools in boyhood and later the Ohio Normal School. He became a very successful and acceptable teacher and for some seven years was engaged in educational work in Cass, Allen, Marion and Portage Townships. Since his marriage he has confined himself more or less to farming and stock raising. With his father-in-law, Levi M. Thomas, he put up all the substantial buildings on the present farm which belongs to his wife. It is well improved and a valuable property. The residence stands on the road that is the dividing line between Portage and Allen Townships, about one and one-half miles southwest of North Baltimore, O.

On September 12, 1895, Mr. Dailey was married to Miss Elsie E. Thomas, a daughter of Levi M. and a sister of J. Curtis Thomas, members of an old and prominent family of this section. Mr. and Mrs. Dailey have four children: Laurel Lynette, Deloy Thomas, Dwight Emerson and Vernard Lowell. Mr. and Mrs. Dailey are members of the First Methodist Episcopal Church at North Baltimore, in which he is a steward. He takes no very active part in politics but is numbered with the most useful and representative citizens of his township, being public spirited, broad minded and law abiding.

ISAAC WALDO MARVIN, one of Findlay's retired citizens of ample fortune, residing in a comfortable and attractive home at No. 206 East Main Cross Street, belongs to an old Hancock County family, which was established here in 1828. He was born at Findlay, November 17, 1855, and is a son of Stephen and Mary (Kelley) Marvin.

The Marvin family, as the name indicates, originated in England. It can be traced in America to Rev. Zera Marvin, who was a well known minister in Pennsylvania, and he was the great-grandfather of Isaac W. Marvin, of Findlay. William Marvin, the grandfather, who was born in Pennsylvania in 1797, came to Hancock County, O., in 1828, and for a number of years, as proprietor of the old Marvin Inn, east of Findlay, was well and favorably known to the traveling public.

Stephen Marvin, father of Isaac W., was born in 1820, in Luzerne County, Pa., and was eight years old when he accompanied his parents to Hancock County. He acquired land which he cultivated and also followed the trade of millwright. In 1841 he married Mary Kelley and they both died at Findlay, in 1893. They were survived by four sons: Isaac Waldo, Cloyd, Clinton and James.

Isaac Waldo Marvin obtained his education in the public schools in the neighborhood of his present home, and at the age of twenty-one he settled down to an agricultural life. For about ten years he continued to farm and raise stock and still retains a large body of farm land, which, since his retirement, he has taken pleasure in quietly overseeing. He is the owner of much real estate in the city of Findlay, included in which is the Marvin Block opposite the Court House. Formerly he was a director in the Farmers' National, now the Buckeye Bank. After leaving the farm and moving to Findlay, he was associated with his brother for some five years in a lumber and planing mill business.

Mr. Marvin was married (first) in 1881, to Miss Lucy Bish, who died in 1886, and was survived by one daughter, Frances, who is a talented and accomplished young lady, a favorite in social circles. In 1890, Mr. Marvin was married (second) to Miss Ada Anthony, and they have had five children: Berenice, Stephen, Mary, Ada Gertrude and Isaac W., Jr. Stephen died in 1906. Mr. Marvin and family are members of the Lutheran church. He has never taken any very active interest in politics, but has always been a good citizen, doing his full duty as such. He is affiliated with the Republican party.

BENJAMIN F. OPP, one of the representative men of Marion Township, Hancock County, O., who has filled many public offices with credit, resides on a farm of seventy-five acres which lies in Section 36, Marion Township and owns a second farm, containing thirty-seven acres, which is situated in Section 31, Big Lick Township, both in Hancock County. He was born on the old family homestead in Lynn Township, Lehigh County, Pa., January 6, 1840, and is a son of John and Lucinda (Kohler) Opp.

John Opp was born on the same farm as his son, in the old stone house, and was a son of Conrad Opp, who was also born on this farm and whose father had come to Lehigh County from Germany. Conrad Opp became a large land owner, not only in Lehigh County but also in Northeastern Ohio and also built and operated a saw mill on Conneaut River, Pa. He died in 1842, in the old stone house probably still standing, which his father had built when he first came to Pennsylvania. His widow, Magdalena, survived him seventeen years. John Opp, father of Benjamin F., was the eldest son in a family of sixteen children. He became a carpenter and cabinetmaker, having natural mechanical skill as was evidenced when, with no technical training, he built an organ that was subsequently sold at Tiffin, O., for $500. He was also interested for a time in the dry goods business at Barnesville, Pa. His death occurred in July, 1861, at the age of sixty-five years. He married Lucinda Kohler, who was born in Luzerne County, Pa., who lived to be seventy-two years of age. They had two children: Fianna, who is now deceased, who was the wife of Daniel Bailey, also deceased; and Benjamin Franklin.

Benjamin F. Opp grew to manhood in Lynn Township and attended school there, having better advantages than were afforded many of his associates and began to teach school when he was seventeen years of age. He then came to Ohio and located in Hancock County and remained away from home for two years, then went back to the old farm for a short time and was married in Lehigh County, returning then to Hancock County. He purchased eighty acres of his present Marion Township farm, which was then mainly swamp land, paying $800. He had the foresight to look forward when this land, properly drained, would be rich in all the essentials for crop production and he kept adding from time to time and improving, laying down a large amount of tile before he was satisfied, and now owns one of the best paying farms in Marion Township. His other property is also valuable and both farms are under careful cultivation at present.

Mr. Opp was married to Miss Sarah Mussick, who died in 1892. They had the following children: John, who married Hattie Altman, has two children—Bertha, who is the wife of Harry Thomas and they have one child, Ruby, and James, who is a graduate of Findlay College; Alexander L., who married Esther Beard, has three children—Onen, a graduate of Findlay College, Grace and Rosella; Ella, who married O. C. Myers and they have two children—Ruth and Walter; Lucinda, who died aged nineteen months; Charles, who married Nellie Smith, has one daughter, May; Flora, who married B. Routson and they have one son, Frank Samuel; Catherine, who is a teacher; and Emmet, who assists on the home farm. Mr. Opp is a member of the United Brethren church. He is a Democrat and has served as a justice of the peace, as township trustee and as a member of the school board.

JOHN REIMUND, who resides on a farm of eighty acres in Allen Township, is also the owner of another farm of forty acres in Allen Township, Hancock County, O., and is extensively engaged in the production of oil. He was born November 28, 1871, in Findlay, O., and is a son of William and Martha (Byal) Reimund.

William Reimund was born in Germany and at the age of three years came to America with his father, Peter Reimund, who settled on a farm in Liberty Township, and was there reared to manhood. When a youth he began learning the harnessmaking trade with William Edwards, of Findlay, O., and remained in his employ about eighteen or twenty years. He then rented the old Price farm in Liberty Township for a time, and later purchased a farm in the same township, where he died in 1896. The mother of our subject is still living.

John Reimund went to live with his uncle, Philip J. Reimund, of Liberty Township, when quite young, and was there reared to maturity. When oil was discovered in this section of the country, he became an oil pumper and pumped some of the first wells operated in this field. He has been extensively engaged in the production of oil since 1902, his first production being on the Franks' farm in Allen Township, and has become very well known in the county as an oil operator. He has been residing on his present farm, which is located in the southwestern corner of Allen Township, since 1907, but previous to that time was living on a farm of forty acres, located on the Decker road. He resides in a fine frame residence which he erected at the time he located on the place.

Mr. Reimund was united in marriage with Mary Franks, who is a daughter of Jacob Franks, and they have two children: Clarence and Guyneth. Mr. Reimund is a member of Hancock Lodge No. 73, I. O. O. F.

JAMES R. CLARK, deceased, was one of Findlay's most respected citizens, where, for a great many years he was a leading business man, the pioneer cabinetmaker and later the largest funeral director in the city. He founded the business which is continued by his son. James R. Clark was born July 24, 1824, and died August 13, 1906.

Mr. Clark was of Irish ancestry, his father, Forbes Clark, having been born in Ireland, and he emigrated to America and settled at Harrisburg, Pa., prior to the birth of his son. The latter was but eight years old when he was left an orphan and he was reared in the home of an aunt, in Cumberland County, Pa., where he lived on a farm until he was eighteen years of age. He then learned the cabinetmaking trade at Gettysburg, Pa., and lived there and at Philadelphia until 1848, when he came to the small town of Findlay, which, even then was showing the signs of awakening that indicated excellent business opportunities for the future. Mr. Clark was possessed of the foresight to take advantage of these and in 1849, having made progress in his trade, he added undertaking to his cabinetmaking and founded the business with which he was identified during the remainder of his life, occupying the same site during all that time. He increased his facilities as the demand for his services grew, and for a long time was the leading funeral director and embalmer in the city. He was a man of quiet tastes and led a simple, well ordered life and was a consistent member of the Lutheran church.

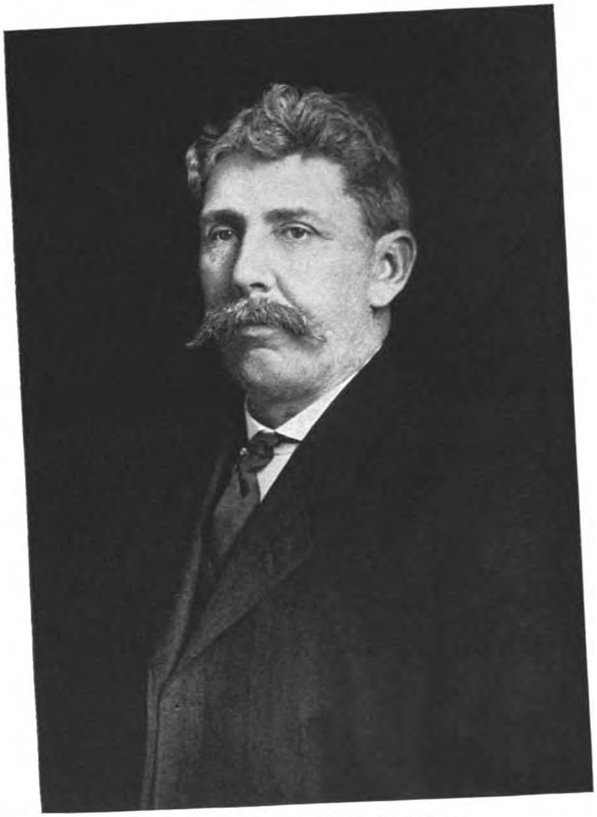
In 1851, at Findlay, Mr. Clark was married to Miss Mary Ann Devine, and they had four children, and the eldest son, W. S. Clark, continues the undertaking business, his location being at No. 119 East Crawford Street, while his residence is at No. 206 West Sandusky Street, Findlay. For more than a half century James R. Clark was an Odd Fellow, but that was his only fraternal connection.

JOHN W. TAYLOR, who carries on general farming on a tract of 101 acres in Section 25, Allen Township, Hancock County, O., is also engaged in the production of oil and is one of the representative citizens of the community in which he lives. He was born December 19, 1840, in Van Buren, O., and is a son of Washington and Martha (Moorehead) Taylor.

Washington Taylor was born July 4, 1818, in Bedford County, Pa., but spent part of his boyhood days in Richland County, O., and in 1836 came to Hancock County, and for several years worked at his trade as a cabinetmaker at Van Buren. After locating on the farm, he gave up cabinetmaking and became noted as one of the most energetic and hard working farmers of the township, and had little patience with those who shirked their duties. He was married to Martha Moorehead, who was born October 30, 1818, in Stark County, O., and died in Allen Township in 1887. She came to Hancock County with her parents during her girlhood days, and was a daughter of John Moorehead, who was born in 1791 in Westmoreland County, Pa., and died in 1876 on his farm in Portage Township, Hancock County, O.

John W. Taylor was about two years old when his parents came to Allen Township and settled on a farm just north of his present one. Here he was reared and as soon as old enough assisted with the work on the farm. He has ever since engaged in agricultural pursuits and in 1864 came to his present farm of 101 acres, which is located on the Taylor road about half a mile west of the Perrysburg turnpike road. Since the discovery of oil in this locality, Mr. Taylor has also been extensively interested in the production of oil. In 1890 Mr. Taylor erected a large frame residence, which is without doubt one of the most beautiful country homes in Allen Township.

Mr. Taylor was united in marriage with Eliza E. Moyer, a native of Westmoreland County, Pa., who has been a resident of Hancock County, O., since her girlhood days, and is a daughter of Elias Moyer, who was a farmer by occupation. Mr. and Mrs. Taylor are the parents of the following children: Etta, who is the wife of Charles Larkin, of Findlay, O.; Milton, who is a resident of Eagle Township, Hancock County, is an oil pumper by trade; Martha E., who is the wife of Samuel Draper; Elmer E., who is now in the gold fields of Alaska; Josiah Vernon, who lives in Illinois; Carl D., who resides at home; Viola, deceased, who was the wife of Edward Douglas; and two children deceased, one at the age of ten years and one in infancy. Mr. and Mrs. Taylor are members of the Van Buren Presbyterian Church, of which he is also an elder.



HON. E. LINCOLN GROVES

HON. E. LINCOLN GROVES, mayor of Findlay, O., and for many years a prominent citizen of Hancock County, was born in Blanchard Township, Hancock County, February 6, 1861, and is a son of Savadra and Lucinda (Fisher) Groves.

Savadra Groves was born in Pickaway County, Ohio, in 1826, a son of Thomas Groves, who was born in Pennsylvania. In 1828 Thomas Groves came to Hancock County and bought a farm in Blanchard Township where he died at the age of eighty-four years. On that farm Savadra Groves grew to manhood and spent his life engaged in agricultural pursuits. His death occurred in 1878. He married Lucinda Fisher, a native of Crawford County, O., who still survives.

E. Lincoln Groves is an only child and he was reared on the old home farm and attended the country schools. He then engaged in the butcher business for a time at McComb, in Hancock County, but shortly after his marriage returned to the farm and continued to live there until he was elected sheriff of the county, January 1, 1905, and his acceptance of the office made removal to Findlay desirable. He served as sheriff through two terms, making an admirable official and retired on January 1, 1909. In the fall of the same year, his Republican friends again called him to public office, electing him mayor of Findlay and he assumed the municipal reins on January 1, 1910. He has always been an active and earnest citizen and many times has been elected to positions of responsibility. For twelve years he served on the Blanchard Township School Board, of which he was president for two years, and in other offices, and was also one of the most highly valued members of the Agricultural Society.

Mayor Groves was married at McComb, O., to Miss Mary Alice McKinnis, a daughter of Thomas McKinnis. She was born and reared in Blanchard Township. Her family is an old one in the county, her grandfather, Charles McKinnis, having settled in Liberty Township in 1827. Mayor and Mrs. Groves have five children, Fern, Carl, Ruth, Albert and Leland. Mayor Groves is a member of Hancock Lodge No. 75, Odd Fellows; the Knights of Pythias, No. 400, and also the Elks and Maccabees. He is giving the people of Findlay a fine business administration and in his efforts he is receiving the full support and commendation of the best class of citizens.

FRANCIS W. FIRMIN, M. D., senior member of the firm of Francis Wilber and John M. Firmin, physicians and surgeons, at Findlay, O., enjoys the honorable distinction of being the oldest practicing physician in this city. Dr. Firmin was born July 15, 1842, at Richfield, Summit County, O., and is a son of F. B. and Mary C. Firmin.

Dr. Firmin is able to trace his ancestry very far back, reaching even to William the Conqueror, but he takes greater pride in the courageous forefather who came from Ipswich, England, to the inhospitable shores of Massachusetts, in the winter of 1630, founding on American soil a family that now has honorable representatives all over the land. From Summit County, O., the parents of Dr. Firmin moved to Springfield, Mass., in 1844, and from there to South Hadley Falls, and later to South Wilbraham, where Francis Wilber attended school. In May, 1862, he came to Findlay and shortly afterward entered Oberlin College, with the intention of completing the regular course of that institution. The agitation incident to the continuance of the Civil War was the cause of many a young man changing the whole current of his life, and young Firmin, with a number of his classmates, determined to leave their books and enter the army to assist in putting down rebellion. His service, which terminated with his honorable discharge on March 10, 1864, was in Co. E, 129th O. Vol. Inf.

The young soldier on his return did not reenter college, on the other hand he made the initial step on the path which subsequently led to a foremost place in the field of medicine at Findlay. He became a medical student in the office of his uncle, Dr. Lorenzo Firmin, under whose direction he prepared for the medical department of the Western Reserve College at Cleveland, where he was graduated February 18, 1867. He immediately entered upon professional work in this city, establishing his own office and continuing alone until he subsequently admitted his son, John M., to partnership. The latter is a graduate of the Cleveland College of Physicians and Surgeons, in the class of 1897. The Firmin name has been one of strength in the medical profession in this part of Ohio for many years, representing at all times, skill, ability, education and close adherence to professional ethics. The present firm is located in the Adams Building. Both physicians are valued members of the leading medical organizations of the country, including the American Medical Association, and the older physician was instrumental in founding the Medical Society of Hancock County.

As a citizen, Dr. Firmin has been zealous in his support of all measures promising to be of permanent benefit to Findlay, giving liberally of his time, means, and professional services on many occasions. He served four years as a member of the city council, seven years as a member of the Board of Education, and innumerable times on committees for the betterment of civic conditions. Since 1872 he has served continuously as examining surgeon for pensions, in Hancock County, with the exception of eight years, during a Democratic administration, and for a large part of that period has been president of the examining board. He is identified with the Grand Army of the Republic and has taken an active interest in the post at Findlay. Fraternally he is an Odd Fellow and a Mason, in the latter organization being particularly prominent, being a Knight Templar and Scottish Rite 32nd degree and a member of the Mystic Shrine.

Dr. Firmin was married on May 6, 1869, to Miss Mary L. D. Meeks, a daughter of Rev. John A. Meeks, and they have had six sons and one daughter born to them: Otis, deceased; Scott, John M., George, deceased; Clara, deceased; Frank Bope and Carl Giles. Dr. Firmin's residence is located at No. 1009 South Main Street, Findlay.

JOHN W. SWAB, who is extensively engaged in general farming and stock raising on a tract of 312 acres in Marion Township, adjoining his residence property, which is located in Section 22, is one of the leading citizens of

Hancock County, Ohio, and was born June 29, 1853, in Washington County, Pa., a son of Solomon and Catherine (Gallaway) Swab.

Solomon Swab was born in Washington County, Pa., where his parents, who were natives of Germany, settled at an early period. He was reared to manhood on the banks of the Monongahela River, and became a ship builder by trade. He later purchased a farm in Washington County and about 1863 brought his family to Wood County, Ohio, and settled on a farm, which now forms the northeast portion of North Baltimore. He operated this farm about seven years, then traded the land for our subject's present farm, which was then owned by John Franks. He married Catherine Gallaway, who was also a native of Washington County, Pa., and they had the following children: Mary, who is deceased, was the wife of James Weaver; Sarah Ann, who died young; Jane, who is the widow of John Weisel; John William; Nancy, who died young; Salina, who is the wife of Frank Bibler; and Alice, who is the wife of James Swartz. The mother of this family died at Findlay, O., and the father's death occurred on the farm.

John William Swab was ten years old when his parents came to the State of Ohio and his educational training was obtained in the district schools of Wood County. About 1873 the family came to Hancock County and settled on our subject's present farm in Marion Township, where he carries on farm pursuits on an extensive scale. He raises and deals largely in stock, keeping about a car load of steers and 100 head of hogs on hand. He has had three gas wells in operation on the place, ran a dairy wagon to Findlay for about eighteen years, and has made extensive improvements on the farm, including the erection of a fine residence.

In November, 1878, Mr. Swab was joined in marriage with Emma Walters, who was born and reared in Hancock County, and is a daughter of David and Amanda (Bear) Walters, who were early settlers of the county. Mr. and Mrs. Swab have reared three children: Nettie, who married G. W. Kistler of Marion Township, and they have three children, Grace, Dorothy, and Lester; Frank, who is a resident of Marion Township, was elected trustee of the township on the Republican ticket, married Bessie George, and has one daughter, Helen Frances; and Julia, who lives at home. Mr. Swab is a Republican.

D. M. DREISBACH, a highly respected citizen of Benton Ridge, Hancock County, O., a retired farmer, for many years engaged in agricultural pursuits in Blanchard Township, where he still retains his valuable farm of 162 acres. He was born in Pickaway County, O., September 28, 1845, and is a son of Abraham E. and Mary Ann (Miesie) Dreisbach.

Abraham E. Dreisbach was born in Bucks County, Pa., February 21, 1818, a son of Rev. John and Fanny (Eyer) Dreisbach. Rev. John Dreisbach was born in Buffalo Valley, Pa., in 1789, and in 1807 he entered the ministry under the leadership of the Methodist reformer, Rev. Jacob Albright, who had founded the Evangelical Association in 1800. John Dreisbach was married first to Fanny Eyer, who died in 1815, leaving two children: Salome and Elizabeth. In 1817 he married her sister, Katherine Eyer, who was born September 22, 1791, and became the mother of his eleven children, named as follows: Abraham E., Isaac E., Catherine E., Sophia E., Jacob E., Leah E., Martin E., Susanna E., John E., Fannie E. and Martha E. In 1831, Rev. John

Dreisbach came to Pickaway County, O., where he invested in much land. He gave all his children a farm and so arranged them that his own farm should be in the center of the settlement. His time was entirely taken up with his ministerial duties. He was a man well fitted for pioneering evangelical work, having the courage and enterprise together with the true zealous religious faith. He purchased the first printing press in Pickaway County and published the first Evangelical hymn book and was the first elder of this religious body in Ohio.

In large measure Abraham E. Dreisbach worthily followed in his father's footsteps. In early manhood he too became a minister and filled various pulpits and during the closing years of his life he traveled as an evangelist. His death occurred at Tiffin, in Seneca County, O. He was married (first) in 1840, to Mary Ann Miesie, a native of Bucks County, Pa., who accompanied him to Pickaway County, O., in the same year. She died February 9, 1857. His second marriage was to Elizabeth Stroll, who died in September, 1871, and in 1873 he was married to a sister of his second wife, who survived him, his death taking place August 28, 1876. His burial and those of his wives took place at Tiffin. All his children were born to his first marriage. The Dreisbach family originated in Germany, the name coming from a German word combined with the numeral three, the family having long been established at a point in Germany where three rivers unite.

Prior to the breaking out of civil strife, in 1861, D. M. Dreisbach helped with farm work and, as opportunity offered, attended the district schools in Seneca County. When the call came for troops he enlisted in Co. B, 195th O. Vol. Inf., and remained in the service until the close of the war, receiving his honorable discharge on December 22, 1865. He was a brave and faithful soldier at all times but was one of the fortunate ones who returned to their peaceful homes without having been seriously injured by the dangers which they had daily faced. He is a member and for three years was commander of Engler Post No. 109, G. A. R., at Benton Ridge, O. Mr. Dreisbach resumed farming and continued until he retired to Benton Ridge, March 1, 1908. Of his farm in Blanchard Township, he has all but four acres under the plow and all of it is well drained. He cleared about one-third of the land after locating on it, and through careful cultivation developed its fertility.

Mr. Dreisbach was married October 15, 1867, to Miss Caroline Wagner, a daughter of Jacob and Mary (Brant) Wagner, and seven children were born to them, namely: Lillie W., who lives at home; Silas W., who married Iowa Green, of Hancock County, lives in Blanchard Township; Helena W., who married L. B. Ray, of Benton Ridge; William H., who married Eva Hickman, of Blanchard Township; Aaron W., who is unmarried; David W., who married Edna George; and Arthur W., who married Zella Watkins, resides in Blanchard Township.

Mr. Dreisbach has been a lifelong Republican, casting his first Presidential vote for Gen. U. S. Grant. He has creditably filled a number of township offices. Formerly he was identified with the local lodge of Odd Fellows and belongs to Mt. Blanchard Lodge No. 519, F. & A. M.

JOSEPH P. BAKER, M. D., of Findlay, who takes high rank among the medical men of Hancock County, was born at Fostoria, Seneca County, O., June 9, 1864. His parents were Joshua C. and Clarissa A. (Moorhead) Baker, the former of whom, a native of Columbiana County, this state, followed the combined occupations of farming and teaching. They were married in 1863 and their family in due time numbered six children. When their son Joseph was an infant they removed to Hancock County, where they have since resided.

In his boyhood days Joseph P. Baker attended school at Portage, and later at Findlay, continuing his studies until he had reached his sixteenth year. From receiving instruction he then took to imparting it, becoming a teacher in the schools of Wood County, O., in which occupation he was engaged for seven consecutive years. He then began the study of medicine, under the guidance of Dr. Anson Hurd of Findlay, an old and well known physician. He subsequently continued his professional studies at Starling Medical College, at Columbus, O., which he entered in 1888 and from which he was graduated in the class of 1890, his marked ability as a student and his personal popularity having won for him the honor of being made president of the class. On leaving college he began the practice of his profession at Findlay and thus continued for several years. To increase his store of medical knowledge he attended in 1894, the New York Polyclinic, and three years later took a post-graduate course in New York, being determined to keep himself abreast with the progress of his profession. His conscientious efforts in this direction have borne their natural fruit in a large and increasing practice and a high professional reputation. Joining the Northwestern Medical Association soon after his location in this city, he served as its secretary from 1895 to 1902, in which latter year the honor was conferred on him of being elected president of this association—an honor that sufficiently indicates the regard in which he was held by his medical brethren, and which was the more remarkable because of his youth. From 1890 until 1893 he served on the Pension Board of Hancock County. He is the leading examination surgeon at Findlay for several of the more prominent life and accident insurance companies, and holds the chair of obstetrics and diseases of children, in the Findlay City Hospital. Besides his membership in the Northwestern Ohio Medical Association, as already mentioned, he belongs to the Hancock County Medical Society, the American Medical Association and the Order of Railway Surgeons.

As an evidence that he was still held in affectionate remembrance by his class-mates, he was elected, in 1901, president of the Alumni Association of his college, being also appointed one of the censors. Dr. Baker is a Free Mason of high standing, in 1891 being made a Master Mason in Findlay Lodge, No. 227, and being also a member of Findlay Chapter, No. 58, Council, No. 59, and Findlay Commandery, No. 49. He was also made a Scottish Rite Mason in 1898, at Cleveland, O., and is a member of Zenobia Temple at Toledo. His other fraternal connections are with Findlay Lodge, No. 85, Knights of Pythias; Findlay Lodge, No. 75, of the Elks, and Hancock Lodge, No. 73, I. O. O. F.

Dr. Baker was united in marriage May 25, 1892, to Miss Harriet Schwartz, a daughter of Mr. and Mrs. Henry Schwartz, and they have a pleasant home at No. 228 W. Lincoln Street, Findlay. In politics, Dr. Baker is a

Republican, although his political activity has been confined hitherto to casting his vote.

CHARLES PHILIP ROTH, a much esteemed farmer and enterprising citizen of Hancock County, O., resides on a fine farm of ninety-three acres located in Section 21, Marion Township, and was born December 11, 1876, in Marion Township, this county, a son of George and Eva (Rouch) Roth.

George Roth was born in Darmstadt, Germany, and in 1844, with his brother Adam, came to America. They immediately went to California in search of gold, Adam working in the gold fields, and George operating a clothing store and tailoring establishment. They subsequently returned to Germany, and some time later came to America again in company with a number of other young people, among them being Eva Rouch, whom the father of our subject shortly afterward married. They came to Hancock County, O., and located at Findlay, where they owned two pieces of property, upon which site the Republican building is now located. This was later disposed of and a farm of sixty acres in Marion Township purchased, and in the course of a few years Mr. Roth returned to Findlay, where he resided two years. He then purchased the Lewis Thomas farm in Marion Township, and there engaged in agricultural pursuits until the time of his death, which occurred January 13, 1897, at the age of sixty-seven years. He is survived by his widow, who is now seventy-two years of age, and makes her home with our subject. Five children were born to George and Eva Roth, namely: Elizabeth, who is the wife of Harvey Johnson; Mary, who married William Busch; Maggie, who is the wife of Henry Springston; William, who died aged nine years; and Charles Philip, the subject of this record.

Charles Philip Roth grew to manhood on his father's farm in Marion Township and as soon as old enough began assisting with the work at home. He purchased his present farm of ninety-three acres from the Tussing heirs, and carries on farming in a general way. On October 4, 1900, he was joined in marriage with Mary Smith, who is a daughter of Michael and Barbara Smith, both living in Eagle Township. Mr. and Mrs. Roth have three children: Harriet, Edna, and George. The religious connection of the family is with the English Lutheran Church of Findlay. Mr. Roth is a Democrat.

WILLIAM BENSINGER, one of the representative and substantial citizens of McComb, a retired farmer and an honored veteran of the Civil War, was born in Wayne County, O., January 14, 1840, and is a son of Reuben and Hannah (Feazel) Bensinger.

Reuben Bensinger was born in Schuylkill County, Pa., in 1818, and died in Ohio in 1884, aged sixty-five years. He came to Medina County with his parents, John and Mary (Alspaugh) Bensinger, the former of whom died in Wayne and the latter in Medina County. The grandfather of William Bensinger was a shoemaker but the father was a farmer and when the latter bought the farm on which he died, all but eight acres was covered with timber. Reuben Bensinger was married to Hannah Feazel, in Wayne County, where she was born, in 1839. She was a daughter of Pleasant and Mary Feazel. Her death occurred in 1902, at the age of eighty-four years. In 1841, Reuben Bensinger, wife and son, moved to Medina County and in 1858, to Hancock

County, settling in Pleasant Township four miles from McComb.

William Bensinger was the only child born to his parents. He attended school until he was sixteen years of age, as opportunity presented, and worked on the home farm until 1861, when he enlisted for service in the Civil War. He was mustered in at Findlay, O., as a member of Co. G, 21st O. Vol. Inf. During the campaign through Kentucky and Tennessee that followed, he was with his regiment continuously and took part in the battle of Ivy Mountain. Subsequently, with twenty-one comrades, he was detailed to capture certain trains and destroy certain bridges and at Big Shanty, while in the line of duty, captured a train on the West Va. Railroad and ran it for ninety miles, but then suffered capture himself. He was imprisoned at Chattanooga and with his companions was court martialed and eight of his comrades were executed. He was held a prisoner for eleven and one-half months when he succeeded in escaping but was recaptured and was then in prison at Atlanta from October until December, 1862, when he was sent to Richmond and was exchanged on March 17, 1863. He reported to his regiment, then at Murfreesboro, and took part in the succeeding campaign which included the battle of Chickamauga. In the meanwhile he had applied to the Secretary of War for a commission as captain of a colored regiment and this was given him and was signed by President Lincoln. In September, 1863, he organized Co. C, 13th Col. Inf., and continued in command until January, 1866. The bravery and efficiency of the troops under his command was shown at the battle of Nashville, when twenty-eight of his men were killed and twenty wounded in twenty minutes. Captain Bensinger was also wounded but he never left the field.

After his honorable discharge, Captain Bensinger returned to the home farm and operated it for two years and then went to railroading, becoming a brakeman on the C. H. & D. Railroad, with which company he remained for twelve years, as brakeman, baggage master, fireman and engineer. He was also with the Pittsburg & Fort Wayne and the L. E. & Western, as an engineer. In 1880 he retired from the railroad and then engaged in farming in Pleasant Township where he continued until 1900, when he sold his farm and came to McComb. Since locating here, Mr. Bensinger has kept himself busy in the agency line, selling fertilizers and fruit trees.

Mr. Bensinger was married February 11, 1864, to Miss Sarah Harris, a daughter of Wesley and Mary (Smith) Harris, of Charlotte, Tenn. She was born in North Carolina and accompanied her parents to Clarksville, Tenn. where both died. Mr. and Mrs. Bensinger have one son, Charles Harry, who was born at Waverly, Tenn. He is connected with the U. S. Mail service. He married Mary Barger, a daughter of Fred Barger, of Pleasant Township, Hancock County, and they have one son, William Frederick.

Mr. Bensinger and son are Republicans. Infrequently he has served in township offices, being constable for one term and in 1890 was census enumerator. He is a member of John Howard Post No. 154, G. A. R., at McComb.

JAMES S. JOHNS, sheriff of Hancock County, O., and one of its most popular officials, was born in Marion County, O., January 21, 1864, and is one of a family of ten children born to his parents, who were Samuel

R. and Isabel (Bruce) Johns, the former of whom was a native of Allen County, but died in Pulaski County, Ind., in 1883.

James S. Johns was reared on his father's farm in Allen County where the family went in his boyhood. In November, 1892, he came to Hancock County and found work in the rolling mills and then went into the oil fields. In the meanwhile he had made many friends in the county and had impressed them with his courage and good judgment and in January, 1905, he was made deputy sheriff under Sheriff E. L. Groves, and in November, 1908, was elected sheriff, on the Republican ticket. Sheriff Johns has proven himself an admirable officer and during his administration many breakers of the law have had reason to fear his stern and unrelenting adherence to the path of duty.

Sheriff Johns was married to Miss Ella M. John, a daughter of Abiah John. They are members of the Methodist Episcopal church. He is prominent in Odd Fellowship, being a member of all its branches, and belongs also to the Knights of Pythias and the Rebeccas.

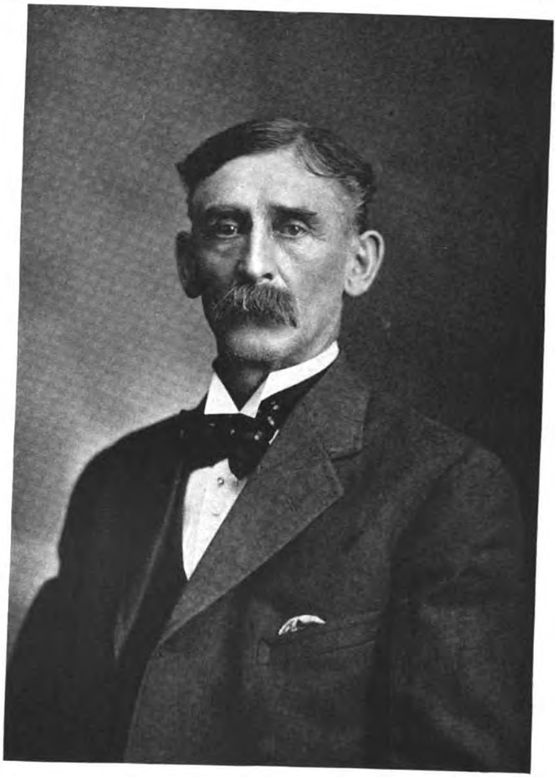
FRANK BROWN, who resides on his valuable farm of eighty acres, which is situated in Section 10, Portage Township, Hancock County, O., about eight miles northwest of Findlay, came to this place in the spring of 1861. He was born in the State of New York, October 10, 1836, and is a son of Joseph and Susan (Severly) Brown.

The parents of Mr. Brown were born in Germany and when they came to America had four children. For some years they lived in Tonawanda, N. Y., and then moved to Crawford County, O., where they remained for thirteen years and then went to Sandusky County, where the father acquired twenty acres of land and by shrewd trading exchanged it for eighty acres. Joseph Brown, with the help of his sons, cleared, ditched and cultivated this land.

When Frank Brown was twenty-five years old he came to Hancock County and located on the place on which he has ever since lived. No clearing or improving had yet been done on this land and he found the task a long and hard one to put the land under its present state of fine cultivation. He cleared up the greater part of his farm by himself. His first house was the usual pioneer log cabin, which he pulled down in 1882 and in its place built the fine large brick house in which he now lives in great comfort. He carried on general farming for many years but has been retired from active labor for some time, renting out his fields to reliable tenants.

Mr. Brown was married to Miss Mary Reed, the estimable daughter of Matthew and Clarissa (Nesbitt) Reed, of Richland County, O. She is a lady possessed of many accomplishments, not the least of these being a complete knowledge of all housewifely arts. By a former marriage, Mr. Brown had nine children born to him, the six survivors being: Mrs. Amanda Jane Milligan, Samuel, Homer, Wilbur, Mrs. Vesta Hutchison and Albert. The three children deceased were: Emma, Moses V. and Lewis, the sons being accidentally drowned. Mr. and Mrs. Brown are valued members of the United Brethren church at Van Buren, O.

J. N. WYER, whose farm of 275 acres is situated in Section 15, Union Township, Hancock County, O., but who resides in Rawson, this county, was born at Lancaster, Fairfield



J. N. WYER

County, O., September 21, 1854, and is a son of Henry and Ann E. (Ashbaugh) Wyer.

Henry Wyer was born in New Jersey, in 1828, and died in June, 1906. He was young when his parents moved to Fairfield County, O., where he grew to manhood and subsequently became a prominent farmer. He married Ann E. Ashbaugh, who was born in Fairfield County, O., and still resides on the old homestead in Marion Township, Hancock County.

J. N. Wyer obtained his education in Fairfield County and in schools near Findlay, to which place he came when thirteen years old. His business has always been farming and stock raising and he settled on his present place after his marriage. This took place on January 24, 1885, to Miss Laura O. Wonder, who was born and reared in Wyandot County, O. Her parents were Mathias and Katherine Wonder, old residents of that county. Mrs. Wyer died August 15, 1909, at Rawson, O. She was a most estimable lady in every relation of life and was a consistent member and earnest worker in the Evangelical church. Mr. and Mrs. Wyer had two children born to them: Oran O. and Mabel. The former is an expert telegrapher and is in the employ of the Lake Shore Railroad. Mabel graduated from the Bluffton High School on May 27, 1910, having taken also a special course in Latin. Mr. Wyer takes no very active part in politics.

JOHN S. ROSE, a well known general farmer and highly respected citizen of Hancock County, O., resides on a farm of 106 acres, located in Section 23, Marion Township, and was born October 6, 1852, at Bellpoint, Delaware County, O., and is a son of Rev. Alvan and Elizabeth (Morey) Rose.

Rev. Alvan Rose was of Scotch-Irish descent and a native of Delaware County, O. His mother died at the time of his birth, and his father subsequently married and moved to Illinois. He was reared by relatives in Delaware County and for seventeen years taught the district school during the winter months and a select school during the summers. He also practiced medicine a short time, but later entered the ministry, and after serving one year in the Mexican War, preached one year in Delaware County and three years in Seneca County. During this time he was sent among the Freedmen of Mississippi on the old Joseph and Jefferson Davis plantation, and while there had the small pox, and was nursed back to health by the old negro mammy who had nursed Jefferson Davis. Upon his return from the south Rev. Rose came to Findlay, O., where he traveled a circuit for many years and was for some years presiding elder of this district. Rev. Alvan Rose married Elizabeth Morey, a native of Pennsylvania, who came to Delaware County, O., at the age of seven years, and died at Findlay in February, 1900. Of their union were born ten children: Amelia, deceased; William, deceased; John S., our subject, and his twin, Anna, the deceased wife of Elias Hoot; Harvey and Horace, twins, both deceased; Alvan, deceased; Lillian, wife of Ernest Jacqua, of Medford, Ore.; Mary, wife of John Hoover, of Portland, Ore.; and Francis. Rev. Rose died in September, 1881, at Findlay, O., aged fifty-three years and eight months.

John S. Rose was a small child when his parents moved to Indiana for a year, from whence they moved to Seneca County, O., and in the fall of 1864 came to Hancock County. Here he was reared and educated and during his early manhood taught school for a time, as did the other children of the family. He was also a clerk for a time in Connell's Book Store at Findlay, but since his marriage has followed general farming on his present farm, which was inherited by his wife, whose grandfather, Major Bright, entered the land from the government.

Mr. Rose was married April 23, 1878, to Minerva Bright, who was born in Marion Township, Hancock County, O., and is a daughter of Levi and Mary (Gear) Bright. Of their union were born the following children: Lulu, died in infancy. Samuel, who resides on part of the home farm, is a graduate of the Tri-State College of Angola, Ind., and taught three years. He is politically a Republican, and in the fall of 1907 was elected clerk of the township and a member of the school board. He is a candidate for county clerk of Hancock County, in the fall elections of 1910. He was married September 15, 1902, to Wilma Smiley, and they have three children, Alvan, Lela, and Ana. May, who is the wife of Roy Bear of Jackson Township, is the mother of two children, Olive Elizabeth and Bernerdine.

Mr. Rose is politically a Republican and has served six years as township trustee. He and his family are members of the United Brethren church, in which he has held all the local offices; and has been secretary of the Circuit since 1885, and has served as a delegate to the Central Conference and in various other offices.

JACOB E. POWELL, M. D., physician and surgeon at Findlay, has been actively engaged in the practice of his profession in this city since June, 1890, and through his professional knowledge and skill, has built up a large and lucrative practice. He was born April 15, 1861, in Eagle Township, Hancock County, O., and is a son of Daniel L. Powell, one of the older residents of Eagle Township.

Dr. Powell was one of a large family of children and during his boyhood and early youth his help on the pioneer farm was needed by his father, the latter having secured his land from the Government in 1836. Agricultural life, however, did not appeal to the youth in any way and he eagerly took advantage of every chance to advance himself in a knowledge of books, and at a surprisingly early age secured a certificate to teach school. He continued to teach and while so engaged continued his own studies and thus prepared himself for entrance to Findlay College, of which he is a charter member, and while there followed the same course and prepared for the College of Physicians and Surgeons, at Baltimore, Md. From that institution he was graduated in March, 1890.

With his diploma in his possession, which had been earned through perseverance and self denial, Dr. Powell confidently entered into practice and the immediate and continued success which has crowned his work, has given the best testimony to the thoroughness of his knowledge as well as to his natural aptitude in this greatest of professions. In 1892 he was elected coroner of Hancock County and served two years but otherwise has accepted no political position.

Dr. Powell was married November 6, 1887, to Miss Eva J. Oman, of Bluffton, Ind. They are members of the Methodist Episcopal church. Fraternally he is an Odd Fellow. His convenient and well equipped office is located at No. 414½ S. Main Street, Findlay.

CLYDE WHELAND, proprietor of the Arcadia Elevator and dealer in grain, seeds, flour, meal, feed, lime, salt, coal, etc., makes a specialty of custom grinding, and is one of the representative business men of Arcadia, Hancock County, O. He was born November 26, 1882, in Arcadia, and is a son of John Henry and Barbara Ellen (Warner) Wheland.

John Henry Wheland was born September 1, 1845, on the old Ebersole farm near Arcadia, O., and is a son of William and Hannah (Kohlmeyer) Wheland, pioneer settlers of Washington Township, Hancock County, O. William Wheland, grandfather of our subject, was born in Center County, Pa., in 1817, a son of Michael Wheland, who was one of the early settlers of that section of Pennsylvania. In 1844, William Wheland, with his wife and child, came to Hancock County, O., and settled near what is now Arcadia, but which at that time was principally timberland, the town not being laid out until some time later. William Wheland married Hannah Kohlmeyer, who was born June 2, 1824, in Butler County, Pa., and their union resulted in the following issue: George W., who served in the Civil War; John Henry, father of subject; Sarah C., deceased, who was the wife of Mosheim Hoffman, deceased; and Mary Jane, deceased, who was the wife of Richard Anderson. William Wheland and his wife both died on the farm near Arcadia, his death occurring at the age of sixty-nine years, and hers at the age of fifty-six years. John Henry Wheland was reared on the home farm, and in early manhood bought seventy-four acres of the home place, of which he cleared about thirty-five acres and placed it under cultivation. About the time of the oil boom in Hancock County, he sold eleven acres at $300 an acre, for town lots, and on November 3, 1889, bought a general store at Arcadia from Fred Farley. This he operated until 1910, when he sold the business to his son, Floyd Wheland, and has since been residing on his farm near Arcadia. During his early life he also operated a drug store for a time, and was one of the organizers and is a director of the Arcadia Bank and Savings Company.

John H. Wheland was married January 24, 1867, to Barbara Ellen Warner, who is a daughter of Jacob and Sarah Warner, and their union resulted in the following issue: Amanda, who is the wife of F. H. Conaway; Parley A., who is manager and proprietor of the Arcadia Electric Light Company; William, who died in infancy; Floyd, who is engaged in the grocery business; and Clyde and Clare, twins, the latter of whom died in infancy.

Clyde Wheland was reared and has always lived in Arcadia, and was educated in the public schools of the town. During his early manhood he engaged in farming on his father's farm near Arcadia, and in 1905 purchased his present business from H. L. Lyons. The building, which is located along both the L. E. & W. R. R. and the Nickel Plate R. R., was purchased from E. P. Huss.

Fraternally Mr. Wheland is a member of the Masonic order at Fostoria, O., and is politically identified with the Democratic party.

In June, 1904, Mr. Wheland married Miss Ethel Parker, who is a daughter of J. H. Parker, of Findlay, O., and they have one daughter, Dorothy.

GEORGE W. MOWERY, one of Pleasant Township's best known citizens and a member of one of the pioneer families, resides on his finely improved farm of twenty acres situated not far from McComb, Hancock County, O. He was born November 6, 1850, in Pleasant Township two miles southwest of McComb, in the log cabin his father had built with care and pride after coming into the wilderness as this section then was. He is the only surviving son of George and Eliza (Asire) Mowery.

George Mowery was born in Virginia and his father was a large slaveholder, having many bondsmen and owning 1,000 acres of land on the James River, forty miles from Richmond, to which city he sent flour from his mills and the products of his distillery. Circumstances led the son George to seek a home in early manhood in a free state and he went to Westmoreland County, Pa., where he married Eliza Asire, a daughter of Henry Asire. She spent her last days with her youngest daughter, Mrs. Growel, at McComb, O., where she died in September, 1907, in her eighty-eighth year. Her family came to Ohio and her parents died in Medina County. A sister and brother, Jeremiah and Mrs. Maria Moore, live in Indiana, and after a brother, David Asire, died at Fostoria, his son, Judson Asire, assumed his father's business interests and is in the undertaking business there.

When George Mowery and family came to Hancock County, in 1846, they made the long journey in the usual pioneer wagon and many weeks passed before they were able to establish their little home. The father was a far-seeing man and he knew that his eighty acres of ridge and swamp land would sometime be of great value although at that time the ridge was covered with a heavy growth and the swamp acres were under water. In fact the whole region between McComb and Toledo was then known as the Black Swamp. George Mowery came first and all alone built the cabin which the family subsequently lived in comfortably and happily for many years. No nails were used in its simple construction. The mud chimney, however, was wide and deep and the subject of this sketch recalls many a happy evening when he and his brother David sat in its glow and warmth and roasted apples and potatoes. In retrospection those days seem to have been full of enjoyment. The death of George Mowery occurred in May, 1867, in his fifty-first year.

To George and Eliza Mowery the following children were born: Margaret, who is the widow of James Morrison, of Findlay; Henry, who died at the age of seven years; Elizabeth, who is the wife of Robert I. Mackey, of Pleasant Township; Susan, who died, aged thirteen years; George W.; David, who is now deceased, was in the employ of the B. & O. Railroad, lived at Defiance and is survived by his widow, Mrs. Rosa (Simcox) Mowery; Ada, who married Turner Mackey, resides with her husband on the old Mackey farm southwest of McComb; Belle, who is the wife of Jacob Growel, of McComb; William, who died aged three years; Jane, who died at the age of five years; and John, who died in infancy.

George Washington Mowery enjoyed district school advantages, but he had to walk four miles along a blazed path through the woods in order to reach the little log school house. As soon as old enough to be useful on the farm his attendance was confined to the winter seasons. He easily recalls when miles intervened between the homes of settlers. When he was but a small lad he could help his father in his harvesting by riding the horses when they trampled the wheat and he could carry the bags of grain on horseback five miles to a fanning mill in order to have the wheat separated from the chaff. Only one who can remember these old and arduous days of farming can fully appreciate the value of modern machinery and the new methods. Mr. Mowery remained on the home farm until he married. He learned the carpenter trade and worked at the same all through this section for twenty-five years but has devoted himself to the cultivation of his little farm for the past few years. In 1907 he started the erection of his handsome ten-room house in which he has introduced many comforts and attractive features.

Mr. Mowery was married in 1873, to Miss Theresa Brown, a daughter of James and Mary Brown, who came to Hancock County from Ashland County, in 1865 and settled in Pleasant Township where Mr. and Mrs. Mowery now live. Mrs. Mowery's mother died on this farm at the age of sixty-three years and her father when aged sixty-six years. They had the following children: Theresa, Mrs. Mowery; Sarah, who is the wife of Ames Barger, of McComb; Thomas, who is a resident of Bellefontaine, married Lillie Longfellow; Maggie, who lives at North Baltimore, O.; and Benton, who lives at McComb, married Daisy Van Stronder, of Van Wert, O.

Mr. and Mrs. Mowery have eight living children, one daughter and seven sons and one son is deceased. Charles B. married Daisy Joyce, of Hamilton, O., and they reside at Lima and they have one daughter, Mabel. Earl resides at home and assists his father. Wallace married Flossie Poe and they have one son, Robert Doldin. Pearl is the wife of George Sharninghaus, a successful farmer of Portage Township, and they have four children. Orie is unmarried and lives at home. Bert is a painter by trade and is now an employe of the Nickel Plate Railroad in Pennsylvania. Ray and Jay are both at home. Mr. Mowery takes no interest in politics beyond the demands of good citizenship. He votes the Republican ticket.

HON. HOMER O. DORSEY, who was elected judge of the Probate Court, in Hancock County, O., in the fall of 1908, has proved his judicial qualities in the most satisfactory way and is numbered with the leading jurists of the county. He was born in Allen Township, Hancock County, O., January 27, 1879, and is a son of Wallace and Lois (Nelson) Dorsey.

Judge Dorsey was reared on the home place and attended the public schools and later the Ohio Northern University at Ada, after which he devoted seven years to teaching and during this time was superintendent of the schools of Arlington, O. For five years he served as deputy clerk under Judge Banker, in the office of the probate judge of Hancock County, and in the performance of the duties of this position not only became well acquainted all over the county but inspired the confidence that resulted in his election with a very large majority, to the office of the probate judge of this county. In politics he is a Democrat and a prominent factor in party affairs.

Judge Dorsey married Miss Hattie E. Dunlap, a daughter of George Dunlap, on February 11, 1900, and they have two children: Loel Dorothy and Anna Lucille. Judge and Mrs. Dorsey are members of the Methodist Episcopal church. Their pleasant home is situated at No. 416 Cherry Street, Findlay. He is identified with the I. O. O. F., the B. P. O. E., the M. W. of A. and the Knights of Pythias, also with various political organizations, and frequently serves on benevolent and public spirited boards

PETER INEBNIT is a well known resident of Blanchard Township, who lives in Section 11, on a valuable farm of ninety-four acres. He was born in the old log house built on this place by his father, February 24, 1849. His parents were Uhlrich and Madalena (Wise) Inebnit.

Uhlrich Inebnit was born and reared in Switzerland and was there married. In 1844, when he was thirty-eight years of age, he came to America and after reaching Hancock County, O., bought forty acres of wild land in Blanchard Township, this being the original homestead. He cleared his farm, but subsequently worked at his trade of tailor whenever he had the opportunity. With the Inebnits the Wises came also to Hancock County, settling in Blanchard Township on an adjoining farm, Uhlrich Inebnit died in 1866, his widow surviving him until 1890. They were the parents of nine children, four of whom were born in Switzerland. The family record is as follows: Elizabeth, now deceased, was the wife of Frederick Wise; Magdalene, who is the widow of James H. McClintock; Uhlrich; Anna, who is the widow of Samuel Behular; John, who is now deceased; Peter; Mary J., who is the wife of William Madouse; Christian D.; and one other that died in infancy.

Peter Inebnit had but meagre educational advantages, as he was obliged to begin the battle of life when but a boy. Brought up on the farm, he acquired a store of practical knowledge pertaining to agricultural affairs, of which he has since made good use. By purchase from the other heirs of his father's property he acquired their interests therein, becoming the sole owner, and he has devoted his land to general farming. He has been quite successful and is numbered among the prosperous residents of his township.

Mr. Inebnit was married April 25, 1872, to Miss Sophia Madouse, a daughter of Frederick and Sophia (Hennings) Madouse. Her parents were married in Germany and on first coming to Ohio located at Fostoria. Mr. Madouse remembered working many a day at splitting rails for fifty cents per hundred. Later he bought the farm in Hancock County, O., on which his son William now lives. The other surviving member of his family is Sophia, the wife of the subject of this sketch. Mr. and Mrs. Inebnit have had six children, namely: Mary E., who is the wife of W. B. Conine and resides in Portage Township, this county; John A., who married Maude Doty and resides in Findlay; George F.; Charles H., who died at the age of twenty-one years; Harvey V., who manages the farm for his father; and Jessie O., who lives at home. Mr. and Mrs. Inebnit are members of the Methodist Episcopal church. They have three grandchildren—Clarence, Mabel, and Rachel Conine. Mr. Inebnit and his sons are Republicans. He has served as township supervisor and also on the school board. He is one of the township's reliable and respected citizens.

ALFRED L. RUSSELL, who owns eighty acres of farm land, situated in Section 6, Big Lick Township, Hancock County, O., six and one-half miles east of Findlay, on the Tiffin turnpike road, was born on this farm, December 17, 1861, and is a son of William and Elizabeth (Taylor) Russell.

William Russell was born in Jefferson County, O., April 14, 1826, a son of William Russell, who was born in County Cork, Ireland, and came to America in 1812. The father of Alfred L. Russell was left an orphan at the age of fourteen years. He came as a farm hand to Big Lick Township where he worked until he purchased the farm which he continued to reside on until his death, on July 20, 1902. In 1852 he was married to Elizabeth Taylor, who was born in Washington Township, Hancock County, and died April 8, 1895. To this union nine children were born, as follows: George, Martha J., Wesley J., Emily, William T., Sarah C., Alfred, Robert B., and Charles.

Alfred L. Russell has spent the greater part of his life in his native township, where he obtained his education, and has been engaged in farming and stock raising ever since leaving school. The favorable location of his farm gives him one of the finest watering places for his stock, in the township. He has two gas wells in operation on the farm that he uses for his own purposes. He purchased this place in 1890, it being a part of the old homestead.

In 1887, Mr. Russell was married to Miss Zettie Snyder, and they have had five children, namely: Floyd, Ethel, Arnot, Ruth, and Kent, who died in infancy. Mr. Rusell and family are members of the Methodist Episcopal church and attend services at Arcadia. He is a Republican in politics but has never been willing to be a candidate for office. He is one of the reliable and representative citizens and practical business men of this section.

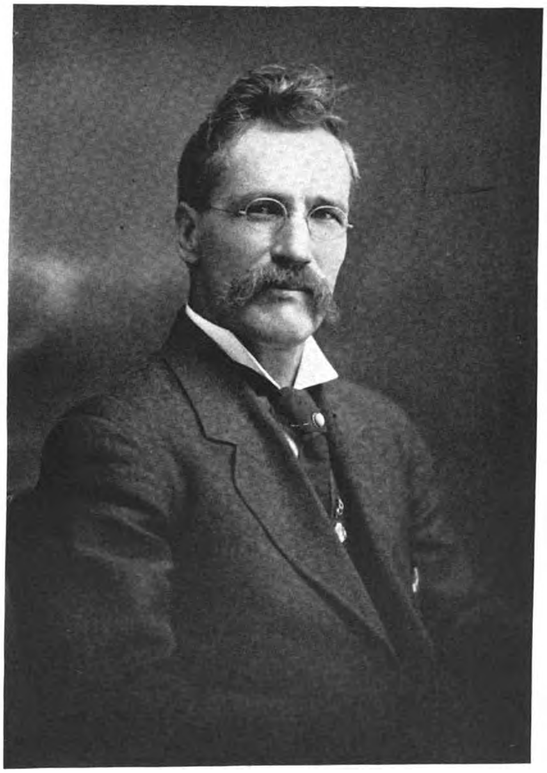
CHARLES F. SMITH, general manager at Findlay for the Toledo, Bowling Green & Southern Traction Company, and a man of enterprise and achievement in various related lines of industry, was born in Cincinnati, November 6, 1863. He is of German extraction, his father, John C. Smith, having come to America in infancy with his parents, who located in Cincinnati where they passed the remainder of their lives. John C. Smith, who was a mechanic by trade, took part in the defence of the Union during the Civil War, serving as a member of an Ohio Infantry regiment. He died in Cincinnati in 1893 at the age of fifty-three years.

The literary education of the subject of this sketch was secured in the schools of his native city, which however he left at the age of fourteen years to accept a position as office boy with the Mt. Adams and Eden Park Inclined Plane Railway Company. After ten years' faithful service with the company, during which time he made the best use of his opportunities for acquiring a knowledge of railway matters, he was made assistant superintendent, and held that position until he came to Findlay, in September, 1887. Here he seized upon an opportunity presented to him, and purchasing the material, superintended the building of the Findlay Street Railway. This line had at first a single trackage of eight miles, which, however, has since been more than doubled. On the absorption of the street railway by the Toledo, Bowling Green and Southern Traction Company, which subsequently occurred, Mr. Smith was made manager of the latter and he has since retained that position. This he is preeminently qualified to fill, as he has served in every department and has a thorough practical knowledge of every department in the business.

But Mr. Smith has also been active in other fields of industrial effort. In 1892 he assisted in organizing the Hancock Light & Power Company and became its president, which office he held for three years. From the reorganization of the company in 1895 he served as vice president until it was absorbed by the Findlay Street Railway Company, four years later. In June, 1901, Mr. Smith took another progressive step, securing the franchise for heating houses by the hot water system, which business is conducted by the traction company, under his management. In all these varied enterprises, each having an important and preeminently useful as well as general application, Mr. Smith has proved himself to be a man of ability and force, such as is needed in every community that aspires to be up-to-date in this Twentieth Century. His success is more noteworthy, as it is not due to the initial advantages of a liberal education, but rather to his own native energy and his ability to see and seize the opportunities presented to him, which many others would have passed by unnoticed. Some of the most successful lives in the history of our country have been made up of just this kind of material, and to record them is to furnish an inspiration to the youth of today that, if heeded, will bear good and plenteous fruit.

Mr. Smith was married at Cincinnati, in 1885, to Miss Lizzie J. Farland, daughter of John M. Farland, and has one son, Harry C. The hospitable home of the family is at No. 718 S. Main Street. In politics Mr. Smith is a Republican. He has fraternal connections with the Masons (being a member of the Mystic Shrine), the Odd Fellows, Knights of Pythias, and Elks.

CLARK L. SHEPPARD, president and general manager of the Sanitorium and Remedy Company, at Nos. 2217-2219 North Main Street, Findlay, O., bears a name that has been identified with the healing art for several generations, both his father and grandfather possessing a knowledge and medical skill that enabled them to eradicate that terrible scourge of the human flesh, cancer. For the relief and cure of this dread disease, together with other persistent blood troubles, the Sanitorium and Remedy Company opened its quarters in this city, in April, 1908. Those interested in the enterprise are all men of high personal and financial standing, the officers being: Clark L. Sheppard, president and general manager; James M. Steen, vice president; and John C.



CLARK L. SHEPPARD

Firmin, secretary and treasurer. The Sanitorium is a commodious three-story brick building which was formerly a hotel. It has been fitted up with every comfort and pleasant surroundings assured patients, many of whom come long distances for treatment.

Clark L. Sheppard was born in Lapeer County, Mich., July 3, 1860, and is a son of Gustavus C. and Hannah M. (Thornton) Sheppard. Gustavus C. Sheppard was born in New York and in early manhood accompanied his father, William Sheppard, to Canada. The latter was a native of England, who had come to America as a missionary and while among the Indians learned of the remedy which his descendants have preserved and so successfully made use of as a healing agent. Gustavus C. Sheppard was married in Canada and moved from there to Michigan, where his daily work was coopering but he was widely known also as a healer through the remedy above mentioned.

Clark L. Sheppard was reared in the pine woods of Michigan. His mother died when he was twelve years old but he remained in Michigan and first made use of this famous cancer remedy while living in Cass County. In 1888 he came to Findlay and began the manufacture of his medicines in 1891 over what is now the Buckeye Bank. For twenty-eight years Mr. Sheppard has been interested along the lines indicated and he doubtless has brought relief, cure and happiness to hundreds of his afflicted fellow creatures. He has grateful letters telling of the same and also has a large collection of valuable relics of various kinds presented to him by those who have been under his care at different times and they make a very interesting exhibit.

Mr. Sheppard was married (first) to Miss Ellen McClury, and (second) to Miss Clara E. Scott. He has four children: Roy, Fisk, Ethel and Glenn. He is identified with the Odd Fellows, the Modern Woodmen and the Maccabees.

ABRAHAM M. KYSER, M. D., a prominent and experienced medical practitioner of Hancock County, O., who has been located at McComb for the past thirteen years, was born in Holmes County, O. three and one-half miles east of Loudonville, May 21, 1833. His parents were Cornelius and Susan (Melott) Kyser.

Cornelius Kyser was born April 1, 1800, in Herkimer County, N. Y. His father was Stacy Kyser, a native of Holland and a man of superior education, having a speaking knowledge of three languages and being able to write in two of these. He settled first in New York but later moved to Bradford County, Pa., where his death occurred. Cornelius Kyser was twenty-four years of age when he went from New York to Pennsylvania and was thirty-two years old when he located, in 1832, in Holmes County, O. He was married in Center County, Pa., to Susan Melott, a daughter of John and Catherine (Bitner) Melott. John Melott was born in the city of Cologne, Germany, and his earlier educational training was for the priesthood. Later he spent seven years at Cologne engaged in the study of medicine and surgery. He escaped from his native land at the time of Bonaparte's invasion, shipped on an out-going vessel and was landed at Philadelphia. There he soon afterward was married to Catherine Bitner, who had been born near Cologne. John Melott died in Center County, Pa., where they were in affluent circumstances, owning

400 acres of land, including the site of the town of Melottville. His widow subsequently married Daniel Boon and after his death she removed to Holmes County, O., where she died and her burial was in the Nashville Cemetery.

Cornelius Kyser moved from Holmes County to Richland County, where his death occurred at the age of seventy-eight years. His widow survived to be eighty-nine years of age, her death occurring at Crestline, in Crawford County. Both parents of Dr. Kyser, with two brothers and a sister, lie buried in the Nashville Cemetery. The mother was a highly educated woman, a fine German scholar and was gifted in music. Of the children of Cornelius Kyser and wife, the following reached maturity: Almira, Catherine, Elsie, Julia Ann, Abraham, Ammon, Hester, Martin L. and James U. Almira was married first to Rev. Percell, a minister in the Disciples church in Illinois. He died soon after marriage from smallpox and their child also died of this disease. Her second marriage was to Samuel Borden. She still survives and is about eighty-nine years of age. Catherine died at Antwerp, in Paulding County, O. She married Isaac W. Young and all the family except two sons died at Antwerp. Elsie, now deceased, was left a widow a few years after her marriage to T. W. Rodgers, a hardware merchant of Cleveland. Julia Ann, now deceased, was the wife of Harrison Quail, who was an artist and musician and was a brother of Senator Quail, of Iowa. Abraham M., was the fifth member of the family. Ammon died of typhoid fever at the age of twenty-three years. Hester resides on the home place at Nashville and is the wife of James McClarren. Martin L. died in early manhood. James U. resides at Mt. Cory, in Hancock County, a farmer. He was married the first time to Ellen Smith, of Mercer County, O., and his second wife was Elizabeth Faulk, of Mt. Cory.

Abraham M. Kyser attended the Nashville schools in his youth and in his desire for a higher education he was encouraged by his mother. Very early he began to teach school and thus in great measure, provided for his own educational advancement, attending the Normal School at Haysville, in Ashland County, and Spring Mountain, in Coshocton County. He taught acceptably in Ashland, Holmes and Coshocton Counties, continuing up to the time he entered the old Buffalo Medical College, after which he practiced medicine for five years and then attended the eclectic schools at Cincinnati and later at Milwaukee, Wis. He has been in harness, as it were, for fifty-two years, beginning at Nashville, going then to Mohickenville, and from there to Mt. Blanchard, in Hancock County and there was associated for a short time with Dr. Clark. From there he went to Vanlue and from there to Mercer County, where he was physician for a convent for over three years. For some eight years he practiced at Monroeville, Ind., and for twenty-two years was at Bluffton, O., coming then to McComb. He stands at the head of his profession here, both as to skill and experience. He is a member of the Northwestern Quarterly Eclectic Medical Association and also of the Ohio State and the National Eclectic Medical organizations. He is the leading exponent of this system of medical practice in Hancock County.

Dr. Kyser was married (first) on April 10, 1860, to Miss Cecelia Moore, who was born at Wooster, O., and died in 1877. She was a daughter of Jesse and Catherine Moore. To this union three daughters and one son were born: Almira E., who is the wife of C. W. Brand, a druggist at Findlay, and they have one daughter, Fera, who married Harry Overton; Israel C., who died in infancy; Lillie M., who married E. N. Kyser, of Findlay, O., and they have one son, Joy; and Cora C., who married Elmer Flack, of Findlay, O., and they have had two daughters and one son: Garnett, deceased, who was the wife of Clyde Chambers, of Lima, now assistant postmaster at Seattle, Wash.; and Vera and Harry, both of whom live at home.

Dr. Kyser was married (second) in 1894, to Miss Della Snyder, a daughter of Peter Snyder, a prominent and wealthy farmer near Lima. Dr. Kyser is an active member of the Presbyterian church although his early religious connections were with the Reform church.

J. L. HIGBIE, M. D., a successful medical practitioner and one of the representative business men of Jenera, Hancock County, O., was born February 23, 1863, in Allen County, O., and is a son of Henry H. and Nancy E. (Suaney) Higbie.

Henry H. Higbie taught school for many years in Indiana and Ohio during his early life, but later engaged in farming in Allen County, O. He died in March, 1908, at Lima, O., where he had been living in retirement for eight years, and is survived by his widow, who is a resident of Lima. They were the parents of the following children: Frank, J. L., Emmet, Bert, Jennie, Cora, and Ada.

J. L. Higbie was reared in Allen County, O., and obtained his early education in the village schools and at Westminster. He also attended the Ohio State Normal School at Ada, for three years, and then read medicine with Dr. Blackson and took a course in medicine at the St. Louis Medical College. In 1888 he came to Jenera, O., where he has since been continuously and successfully engaged in following his profession. Dr. Higbie is a member of the Hancock County and Northwestern Medical Societies. He is politically a Democrat, and was for thirteen years a justice of the peace, and for six years served as mayor of Jenera. He is vice president of the Farmers' Banking Company of Jenera, and his religious connection is with the Lutheran church.

Dr. Higbie was joined in marriage with Miss Mary E. Traught, a daughter of Peter Traught, who resides near Jenera, and of their union were born the following children: Una, Lloyd, Merle, and Howard.

FREDERICK J. BICKELHAUPT, a retail grocery merchant of Findlay, O., is a native of Germany, having been born in the Province of Hesse-Darmstadt, near the River Rhine, in 1843, a son of John Bickelhaupt. The latter, who was born also in Germany, in 1821, emigrated with his family to the United States in 1851, locating first in New York City. A year later they came to Findlay, O., where Frederick J. Bickelhaupt has since made his home. The father died at Findlay in 1896.

Frederick J. Bickelhaupt in his youth received but a limited education, but later reading, together with observation and contact with the practical affairs of life, broadened his understanding and made him in time a man of good mental equipment, which he is today. When the Civil War broke out, like so many of his countrymen, he offered his services, enlisting at Findlay, in October, 1862, in Co. G, 57th O. Vol. Inf., with which he saw an active service of four months, for the following three months being confined to the hospital. Subsequently receiving an honorable discharge, he returned to Findlay and entered into partnership with his father in the grocery and produce business, which connection lasted until 1881, when the elder partner retired from the firm. The business was continued alone by the junior partner until 1896, when he also retired for a time from business activity. However, in 1907, he resumed as a retail grocery merchant and is conducting a large business at No. 513 So. Main Street, Findlay, where he has a modern, well equipped store. In the past as in the present, Mr. Bickelhaupt won public confidence through honorable methods. In politics he supports the principles and policies of the Republican party, taking an intelligent interest in public affairs and always casting his influence on what he believes to be the right side. Fraternally he holds membership in the Independent Order of Odd Fellows.

Mr. Bickelhaupt was first married in 1870. In 1894 his second union occurred, to Miss Addie D. Folk, a daughter of George Folk, of Findlay. Her family is an old one in this state, dating from pioneer days, and her maternal grandfather, Israel Pence, was born in Ohio and served against the British in the War of 1812. Mr. and Mrs. Bickelhaupt have a pleasant residence at No. 131 West Lincoln Street. They are held in high esteem by the citizens of Findlay.

CYRUS W. CANFIELD, one of the representative agriculturists of Cass Township, Hancock County, O., and a well known and valued citizen of a section in which his life has been mainly spent, owns 160 acres of valuable land which lies partly in Cass and partly in Allen Township. He was born on this farm, in the old log house which was the pioneer home of the family, January 23, 1845, and is a son of Elijah C. and Sarah (Weiss) Canfield, a grandson of Eli B. and Johanna (Wright) Canfield, and a great-grandson of Elijah Canfield.

The first Elijah Canfield was born in England but he evidently was brought early to the American colonies and the family record tells of his becoming a soldier in the Revolutionary War when a youth of fourteen years and of his being held in such favor by the great commander that he was made one of Gen. Washington's body guards. He spent his closing years in Ohio and died in Portage County when within six years of the century mark. The name of his wife has not been preserved but he had three sons and three daughters born to him.

Eli B. Canfield, grandfather of Cyrus W. Canfield, was the eldest of the above six children and he was born in one of the mountainous counties of the State of New York. After the War of 1812, in which he possibly took part, he moved to Ohio and settled in Portage County. From there, in 1836, he moved to Hancock County and located in the deep woods in Cass Township, with his nearest neighbor fully a mile distant. Subsequently he sold that farm and in 1846 moved to Michigan, where he bought a quarter section of land and resided there until the time of his death, just prior to the opening of the Civil War, when aged seventy-six years. His old age thus was preserved from the grief that would have fallen on him had he known that within a few years one of his stalwart sons, Elanson, would have died on the field of battle, suffering from fourteen wounds made by Confederate bullets. His widow survived him six years, dying also in Michigan. They had eleven children, five of whom survived infancy, namely: Murwim, Elijah Cyrus, Harry, Elanson and Harriet. The only one yet living is Elijah Cyrus, the venerable father of Cyrus W. Canfield.

Elijah Cyrus Canfield comes of a long lived family. He was born September 14, 1820, in Portage County, O., and was only a boy when the family came in its covered wagon to Hancock County, an ox-team drawing the same safely over the rough unsettled country. In those early days in Cass Township, schools had not yet been generally established and he was so eager to gain some book knowledge that he attended a subscription school for three months after he was twenty-one years of age and paid for the instruction himself. As soon as he was old enough he went into the woods and did his share of clearing, working over many acres. About the time of his marriage he bought the farm of forty acres on which he still lives, from his father, and was, in his prime, probably the equal of any farmer in this section. He also followed threshing for a number of years and in his work, while active, was more or less associated with his son, Cyrus W. He has always been a Democrat and still deems it his duty to exercise his right of citizenship. Mr. Canfield is the oldest resident of Cass Township.

Elijah Cyrus Canfield has been twice married. On February 27, 1844, he was united with Sarah Weiss, who left three children at her decease some years later, namely: Cyrus W.; Mary, who became the wife of William Gassman, and they have five children—Charles, James, Philip, William and Minnie; and Ella Jane, who married Warren Albertson and they have two children—William and Lillian. On December 25, 1884, Mr. Canfield was married again, this time to Mrs. Sarah Weiss, widow of Reuben Weiss and daughter of Samuel and Mary (McDougal) Edgar. No children were born to Mr. Canfield to this union but Mrs. Weiss had eight children born to her former marriage: Graig, Mary, Lavina, Sarah, Melissa, Alta, and three that died in infancy.

Cyrus W. Canfield obtained a district school education. He has always lived on his present farm but also has a home in the South, where he spends his winters. He assisted his father for many years and for fifty years followed threshing as a business, beginning with the old horse-power thresher, he and his father owning the first machine of the kind in Hancock County and they operated with it for twenty-three seasons. Later improved machinery was purchased and when Mr. Canfield retired from the business he owned modern equipments. At different times he has made improvements on his property and his comfortable residence is a well arranged eight-room house.

Mr. Canfield was married to Miss Maria Ames, a daughter of Milton Ames, and they have two children: Sadie and William. The former is the wife of J. C. Kissell and they have three children: Treasure, Paul and Ruby. Mr. and Mrs. Kissell live in Allen Township, Hancock County. William Canfield is a resident of Wood County. He married Bertha Huffman and they have two children: Orpha and Fay. Mr. Canfield, like his father, is a

Democrat and at different times he has served as school director and supervisor.

J. CURTIS THOMAS, a prominent farmer and large land owner, of Portage and Allen Townships, Hancock County, O., has 160 acres in Section 10, in the former and eighty acres directly across the highway, in Allen Township. He was born on this farm, February 12, 1875, and is a son of Levi M. and Mary C. (Wilson) Thomas.

Levi M. Thomas was born on Sand Ridge, Pleasant Township, Hancock County, a son of Jacob Thomas, who came to Ohio from near Moundsville, W. Va. Levi M. Thomas was reared in Pleasant Township and came to the farm owned by his son, J. Curtis, just after his marriage and cleared the land and made all the improvements. He was a successful farmer and large stock raiser and owned 372 acres of valuable lands. His death occurred May 11, 1906. He married Mary C. Wilson, who was born in Illinois and was brought to Ohio in girlhood by her father, William Wilson. She survived until November, 1905.

J. Curtis Thomas has always been interested in farm pursuits and has been particularly successful in many branches of agriculture. He carries on a general farming line and raises stock and since 1891 has made a specialty of raising Percheron horses.

Mr. Thomas married Miss Alta Cathers, who was born and reared in Pennsylvania, a daughter of James Cathers, and they have three children: Mary Chloette, James Levi and Harold Curtis.

J. C. SHELDON, proprietor of a saw mill and one of the prominent business men of Houcktown, O., was born April 10, 1853, on a farm in Amanda Township, Hancock County, O., and is a son of James Washington and Easter (Clowr) Sheldon, who were well known farmers of this county. The father died in 1895 at Bluffton, O., and the mother died in 1880.

J. C. Sheldon attended the district schools and remained on the home farm until nineteen years of age, since which time he has been engaged in business for himself at Houcktown. He engaged as a bridge contractor for a number of years, and has for years operated a saw mill, buying timber which he prepares for the market. He deals principally with the farmers of this locality, although he disposes of considerable red oak, basswood and maple at Findlay, and constantly employs two men in the mill beside himself. Mr. Sheldon recently purchased from Mrs. Hannah Brown a grist mill, which is one of the land marks of Houcktown, and will remove it to his saw mill property, where he owns one acre of land. Besides his residence property at Houcktown, where he has a lot 120 by 140 feet, he also owns eight acres of farm land north of Houcktown, and also owns the only blacksmith shop in town. This he rents out. With his sons he owns three sets of oil and gas well tools and contracts in drilling.

Mr. Sheldon was joined in marriage with Miss Sarah A. Marquat, who was born in Findlay, O., a daughter of John Marquat, and of their union were born the following children: Hettie Lorena, who is the wife of M. C. Woodward, of Marion, O.; Bert LeRoy, who is married and a resident of Findlay; Edith Lavinda, who is the wife of F. M. Sampson of Arlington, O.; Cleo ,who is employed as a stenographer at Columbus, O.; Annie; John James; Grover Perry, who is married although but seventeen years old; and Irma Lorina.

SAMUEL L. McKELVY, formerly attorney at law but now engaged quite extensively in the insurance and real estate business at Findlay, O., was born on a farm in Island Creek Township. Jefferson County, O., January 4, 1848, and is a son of Crawford and Charity (Van Gilder) McKelvy.

Crawford McKelvy was an old settler in Jefferson County. In 1849 he made his first trip to the gold fields in California, where he remained for two years and then came home for a visit but subsequently went back and made a longer stay in the mining regions. In the fall of 1861 the McKelvy family moved on a farm in Orange Township, Hancock County, which the father sold in 1867, and they then moved to Plymouth, Ind.

Samuel J. McKelvy attended school in Orange Township and during the spring and fall of 1866 was a student in the Findlay High School and after the family removed to Plymouth, Ind., he entered the High School there and was graduated in 1868. Mr. McKelvy went then to Ann Arbor, Mich., where he entered the University of Michigan and remained two years, taking a special course. From there he accepted the position of principal of the High School at Missionary Valley Junction, Ia., and while there read law in the office of Judge Pealon. During a period spent in the South he was admitted to the bar and engaged in law practice in Arkansas until 1876, when he returned to Indiana and engaged in practice and dealing in real estate at Plymouth until 1890, when he came to Findlay, where he has been an important business factor.

Mr. McKelvy is undoubtedly the largest real estate dealer in this city, making a specialty of Findlay property, although he is also interested elsewhere. He is president and half owner of the Roanoke Development Company which owns over 1,000 acres of land, a part of which is being developed for oil and other parts devoted to rice culture and the raising of livestock. Mr. McKelvy has a winter home on this property, which is situated at Roanoke, La. He has been the organizer of a large amount of city improvement—built the McKelvy Block on South Main Street, and owns the three-story brick block opposite, a 50-foot business lot opposite Argyle block, and owns additionally a part of the Currier Block together with residence and unimproved realty. Through his open and energetic business methods a large amount of outside capital has been brought here. His business in fire insurance is also a large item as he handles the risks of eleven of the leading companies. Such men of business enterprise are of value to any section.

Mr. McKelvy married Miss Dollie P. Hargitt, a member of a Southern Indiana family, and they have five children: Clara May, who is the wife of Charles E. Sprague, of Cleveland; Mattie L., who is the wife of H. G. David, of Findlay; Maud M., who is a teacher in the Findlay schools; Erdien H.; and Loy De Witt, who is a student in the Northern Ohio University at Ada. Mr. McKelvy is a member of the order of Ben Hur and the Masons.

FREDERICK LUDEN, a prosperous general farmer of Allen Township, and one of the early settlers of Hancock County, O., resides on a valuable farm of eighty-five acres, and was born September 15, 1830, in Baden, Germany, a son of Frederick and Rosina (Shuck) Luden. The parents of our subject were both born and died in Germany, and his maternal great-grandfather Shuck, was a man of considerable wealth, and the manufacturer of fine fur garments.

Frederick Luden was reared in Baden, Germany, and there learned the French dyeing trade, making paints and coloring for calicoes and other materials. At the age of eighteen he came to America and located at Findlay, Hancock County, O., where he worked for two years in the old Swat Hotel. In 1851 he came to Allen Township and worked for five years for his uncle George Luden, who in 1841 came to this county from Wayne County, O., and located in a log cabin on the farm which our subject now owns. After leaving his uncle's home, Frederick Luden went to Wood County, O., where he was employed for two years in the largest hotel in the county. In 1855 he returned to Allen Township, Hancock County, and worked as a farm hand until 1861. He is now the owner of a fine farm of eighty-five acres, which is one of the most productive and highly cultivated in Allen Township, and which yields larger crops than most of the other farms in this locality.

Mr. Luden was joined in marriage with Agnes During, daughter of Rev. Matthew During, pastor of the German Lutheran Church of Findlay. Of their union were born seven sons: George, Paul, Frederick, Albert, Jacob, William and John, all of whom are stil living. Mrs. Luden passed out of this life in 1906. Mr. Luden is a member of the German Lutheran church of Findlay.

ERWIN ELLSWORTH EWING, ex-sheriff of Hancock County, O., a lifelong resident and for years prominently identified with oil production in this section, was born in Liberty Township, July 6, 1862. His parents were Jacob and Louisa (Cooper) Ewing.

Jacob Ewing, father of Erwin E., was born August 16, 1836, in Ashland County, O., and accompanied his parents to Hancock County in 1854. They were Jacob and Sophia (Mowery) Ewing, natives of Pennsylvania. They accompanied their families to Ashland County, O. where they were married and resided until they came to Hancock County and settled in Liberty Township. Grandfather Jacob Ewing purchased 160 acres at first and later acquired more land until he owned about 300 acres. He died on the farm now owned by Jeremiah Ewing, in 1866, at the age of sixty-eight years and was survived but a short time by his widow. They had seven children, namely: Cornelius, who lives at Findlay, married Elizabeth Insley; Julia Ann, who is the widow of Elijah Goudy, resides at Findlay; Philip, who lives in Pleasant Township, married Sophia Swartz; Rudolph, who is a prominent farmer in Pleasant Township, married Elizabeth McKinnis; David, who died during the Civil War; Jacob; and Elmira, who is the widow of Richard Boyd and is a resident of Findlay.

In 1859, Jacob Ewing was united in marriage with Louisa Cooper, who was born in Licking County, O., a daughter of Hiram Cooper, a farmer who resided in Wood County previous to coming to Hancock County, his death taking place in 1883, in Blanchard Township, at the age of eighty-one years. He was also a brick and stone mason and some of his work still may be seen in structures standing in the vicinity of McComb. He had a large family of children but the only one remaining is Miss Ellen Cooper.

ERWIN E. EWING

After his marriage, Jacob Ewing settled on the old home place and also acquired a tract of land in Liberty Township which he sold later, buying a farm in Pleasant Township, one mile south of McComb. Mr. Ewing, in 1888, exchanged this farm for eighty acres situated one-half mile east of Deweyville, which his son, H. C. Ewing, now occupies. He came to this farm in 1878 and died here in the same spring, being in his forty-second year. His widow survived until March 13, 1904, her age being sixty-eight years. Her mother, the maternal grandmother of Erwin E. Ewing, Mrs. Louisa (Mills) Cooper, who died August 9, 1901, survived many of her descendants, her age, at time of decease, being 100 years and sixteen days. Six children were born to Jacob and Louisa Ewing, namely: Ella, who resides at Deweyville, O.; Erwin E.; Hiram C., who lives on the old home place in Pleasant Township, married Metta Bolton, daughter of Michael Bolton; Earle, who resides with his sister at Deweyville and is engaged in farming; Charles, who owns and operates a farm near Deweyville; and Jennie, who died at the age of two years.

Erwin E. Ewing obtained his education in the public schools but it was interrupted on account of the death of his father when he was but sixteen years of age. Being the eldest son many responsibilities fell on his shoulders which, in spite of his youth, he bore in a manly and efficient way. He remained on the farm and was also interested for a number of years in the timber business, this region then being one where this industry was carried on with vigor at that time, valuable timbered land being purchasable at a very low figure. He bought 120 acres for less than $2.25 per acre and realized handsomely on the investment. He early became interested in politics and served as deputy sheriff under several officials, first under Sheriff Cusac, and in 1890, under Sheriff Bartoon. In 1896 he was elected sheriff on the Democratic ticket and was re-elected in 1898, serving out two terms and retiring from the office with the high regard of all law-abiding citizens. Mr. Ewing then turned his attention to the oil business and for five years has been operating extensively in Crawford and Clark Counties, drilling a number of wells and in partnership with his cousin, P. W. Ewing, securing numerous leases. His operations in oil have been carried on in Illinois. He still is a leading factor in county politics and for a number of years has been a delegate to important conventions of the Democratic party. He is deeply interested in the public issues of 1910 and is ready to prove his loyalty to Democratic principles. Being a man of fine address and courteous manner, he exerts an influence in many circles and makes many personal friends. His place of residence is Deweyville, O.

Mr. Ewing is identified fraternally with Lodge No. 227, F. & A. M. at Findlay; Findlay Commandery, No. 49; and Mystic Shrine at Toledo. He has also attained the 32nd degree in the order. He belongs also to the Elks and the Knights of Pythias, both at Findlay. He was reared in the Presbyterian faith.

N. J. KRAMER, a well known citizen of Rawson, O., who has lived in this pleasant town for the past sixteen years, still retains his farm of eighty acres, which lies in the northeast corner of Section 10, Union Township, Hancock County, O. He was born in Fairfield County, O., August 26, 1849, and is a son of John and Hannah (Boyd) Kramer.

John Kramer was a native of Fairfield

County but later acquired a farm in Franklin County and died there July 10, 1901. He was a well known farmer and respected citizen and for some twenty years held public office in Franklin County. His wife died in 1890.

N. J. Kramer was reared in Franklin County and for thirty years lived on his farm in Union Township, Hancock County. In 1860, he was married to Miss Susanna Fox, a daughter of David and Elizabeth (Bartoon) Fox, of Hancock County. David Fox was born in Pennsylvania and died in 1875. His widow survived until 1892, her death taking place near Rawson. Mr. and Mrs. Kramer have had six children, as follows: David E., who married Lois Keller, has had three children—Ines, Grace and Erma, deceased; J. H., who resides at Little Rock, Ark., married Elizabeth Phillips, of Tennessee, and they have one child, Morris; Hannah E., who is a twin of J. H., married Isaiah Foltz, of Hancock County, and they have two children—Coyl, and Edna; Willard, who married Cora McLish, of Union Township, has seven children—Mabel, Mary, Florence, John, Clara, Scott and Frances; Wilson P., a twin of Willard, married Lettie Clapp now deceased, and has four children—Walter, Wallace, Dwight and Myra, and Carrie D., whose untimely death occurred at Rawson in 1898, at the age of nineteen years. Mr. Kramer and family are members of the United Brethren church. For four years Mr. Kramer was a trustee of this church and for ten years officiated as its sexton.

WILLIAM N. YOST, M. D., physician and surgeon, who has been engaged in the practice of medicine at Findlay, O., since 1892, and in Hancock County since 1872, occupies a foremost position in his profession in this section of the state. Dr. Yost was born at Thornville, Perry County, O., April 14, 1837, and is a son of Peter and Elizabeth (Taylor) Yost.

Peter Yost was of German extraction. In the childhood of his son, William N., he bought a farm in Licking County, O., near the Perry County line, within three miles of Thornville, and it is still called the old Yost farm in that neighborhood.

William N. Yost was reared on the above named farm and went to the country schools during boyhood. Later he attended the Thornville schools and subsequently the Somerset Collegiate Institute, where he completed the course. For a number of years after this he taught school, being located in Thorn Township, in Perry County, and in Union Township, in Licking County, and for four years previous to the Civil War, he had charge of the Union school at Hebron, in the latter county. During a part of this period he was township clerk and all his spare time was given to the preliminary study of medicine under the direction of Dr. Black. In June, 1862, he entered the Federal army, becoming hospital steward of the 113th O. Vol. Inf., and continued with that regiment and in the same capacity until the close of the war.

When his military service was over, Dr. Yost entered the Miami Medical College at Cincinnati, where he was graduated in 1868, and he entered into practice at Houcktown, Hancock County, where he remained for five years and then moved to Mt. Blanchard and continued in practice there until he came to Findlay. Dr. Yost maintains his office at No. 322½ South Main Street. He is a member of the Hancok County, the Northwestern and the Ohio State Medical Societies.

Dr. Yost married Miss Rebecca Stewart, a daughter of that brave soldier, Major James Stewart, of Licking County, O., who served through the Civil War. Dr. and Mrs. Yost have had five children: Minnie L., who is the principal of the Firman School at Findlay; Margaret, who died in 1902, was the wife of Harry George; Jessie Gertrude; Charles C., who is bookkeeper for the Logan Gas Company; and Clarence E., who is secretary of the Findlay Casket Company. Dr. Yost served on the Pension Board for eight years during the Cleveland administration. Dr. Yost is a member of all branches of Odd Fellowship and has served as a representative to the Grand Lodge. He is identified also with the Masonic fraternity and the B. P. O. E., and belongs to the G. A. R.

LEVI SEARFOSS, who owns forty-three acres of richly cultivated land situated in Marion Township, Hancock County, O., devotes this largely to potatoes and berries, finding truck farming very profitable. He was born in a log house standing on his father's old farm, in Marion Township, January 2, 1845, and his parents were Jacob and Eliza (Garster) Searfoss.

Jacob Searfoss was born and reared in Pickaway County, O., and in 1840 occurred his first marriage. He and wife came immediately to Hancock County and settled on the farm in Marion Township where H. H. Johnston now lives. He entered eighty acres of heavily wooded land and in the log cabin he built there passed his life. His first wife died in 1848, leaving three children: Levi; Mary Ann, who is now deceased, who was the wife of Burtis Yocum; and Henry, who lives in Indiana. Jacob Searfoss then married Jane Powell, who is also deceased, and they had one daughter: Margaret Jane, who is the wife of S. Rinkhammer, of Marion Township.

Levi Searfoss has spent his entire life in Marion Township with the exception of eighteen months passed in Illinois. He attended school while small, but as soon as able began to help in the clearing of the farm. He then learned the carpenter trade and followed the same for twenty-five years, spending twelve of these in the factory of Shull & Company. He built his attractive nine-room frame house into which he introduced many comfortable devices.

Mr. Searfoss was married the first time to Miss Samantha J. Alspach. His second marriage was to Mrs. Sarah M. (Jacobs) Switzer, widow of Jacob Switzer and daughter of James Jacobs. The children, four in number, were born to the first marriage. Harry married Mollie Jacobs and they live at Columbus and have two children—Florence and Etna. Eliza is the widow of Nelson Jacobs and they had three children—Ralph, Eva and Mamie, and they reside with Mr. and Mrs. Searfoss. Elizabeth and Flora also reside at home. No children have been born to the second marriage. The family belongs to the United Brethren church. In politics, Mr. Searfoss is a Democrat and at times he has served as road supervisor and school director. He is identified with the order of Odd Fellows at Findlay.

L. S. WOODS, M. D., who enjoys the distinction of being the oldest resident physician of Rawson, O., and is a valued and honored member of the Northwestern Ohio and the Hancock County Medical Societies, has been an interested spectator of the growth and development of the pleasant town in which he chose his home, when starting out on his professional career. Dr. Woods was born November 3, 1853, in Madison Township, Hancock County, O., a son of James and Hannah (Hatcher) Woods.

James Woods was born November 16, 1810, in Columbiana County, O., and his wife was born in Stark County, O., July 5, 1815. They were married in 1833, settled in Delaware Township, Hancock County, in 1837, but in 1840 moved to Madison Township, which remained the old home place during the lives of the parents and one to which the children often tenderly and reverently return in thought. James Woods lived into extreme old age, surviving his wife for many years, her death having taken place in 1894. Of their eight children, Dr. L. S. Woods was the youngest born.

From his boyhood, L. S. Woods cherished an ambition to become a physician. When the proper age was attained he was given an opportunity to study medicine under his older brother, Dr. Thomas E. Woods and made such rapid progress that in three years time he was adequately prepared to enter the College of Physicians and Surgeons at Baltimore, Md. There he was creditably graduated on March 17, 1887. He opened an office at Rawson and has become so closely identified with all that pertains to the progress and well being of this town that his name is inseparably connected with much that is important here. His interest is reciprocated and he is not only valued for his professional skill and business judgment and public spirit, but is esteemed for his purely personal qualities.

Dr. Woods was married January 1, 1884, to Miss Inez E. Kelly, a daughter of George J. and Caroline Kelly, who were early settlers in this section. Dr. and Mrs. Woods have three children: Leo Mozelle, Scott K. and Hannah K. Dr. Woods is prominently identified with both the Masons and Odd Fellows. He is a Republican in his political sentiments.

JESSE W. MONTGOMERY, chairman of the Board of County Commissioners of Hancock County, O., and residing in Orange Township, where he owns 340 acres, was born on the farm on which he lives, March 15, 1857, and is a son of John and Eleanor (McLain) Montgomery. The mother of Mr. Montgomery died in 1905, but the father survives.

Jesse W. Montgomery was reared on the home farm and his education was secured in the country schools. He has devoted himself to agricultural pursuits and has engaged extensively and successfully in general farming and stock raising. He has taken an active and intelligent interest in politics ever since attaining his majority and has long enjoyed the confidence of his fellow citizens. He served as treasurer of Orange Township for fourteen years and is now serving in his second term as county commissioner, first assuming official duties September 20, 1906, and entering upon his second term in September, 1909. In his political views he is a Democrat.

Mr. Montgomery married Miss Mary R. Mitsch, a daughter of John Mitsch, who was born in Germany and came to Wyandot County, O., when a boy. He was accidentally killed October 22, 1909, near his home at Bluffton, Allen County, an automobile causing his horse to run away. Mrs. Montgomery was born and reared in Wyandot County. Mr. and Mrs. Montgomery have eight children: John, Walter, Lida, Frank, Edgar, Helen, Ivan and an infant. Mr. Montgomery is a member of the order of Odd Fellows.

A. M. AGIN, a representative citizen of Van Buren Township, Hancock County, O., where he carries on farming on sixty acres of land and manages eighty more, was born in Orange Township, September 1, 1860, and is a son of William Agin.

William Agin was born in Fayette County, Pa. His father died when he was two years old and his mother in his fourteenth year. He came to Trumbull County, O., and worked at the tanning business and was married there the first time and one child was born to him. In 1836 he moved to Hancock County and entered 160 acres of land in Orange Township. In 1837 he was married to his second wife in Trumbull County and they had five children. He was married the third time to Mary (Montgomery) Thompson, the widow of William Thompson, and five sons and two daughters were born to this union. The family home remained in Orange Township, where the father died in 1891 and the mother in May, 1907. They were members of the German Reformed church and their burial was in the Hassam Cemetery. William Agin was a well known man and carried on his business enterprises honestly and successfully. In earlier years he built a tannery on his farm in Orange Township and conducted it together with his farm work but subsequently rented the tannery to a nephew.

A. M. Agin attended the public schools in Orange Township and later the Ohio Normal University at Ada, after which he taught school for some time. After his marriage he settled first on a farm on the township line between Van Buren and Orange Townships and came from there to his present farm in 1907. He has done a large amount of clearing on his property and has all but twelve acres under tillage on the sixty-acre tract. His comfortable and substantial buildings have been erected since he came to the place.

Mr. Agin was married in April, 1884, to Miss Annie E. Stonehill, a daughter of Jacob and Elmira (Miller) Stonehill. Jacob Stonehill, who died in 1907, established himself in the undertaking business in 1859 and was one of the earliest and became one of the best known funeral directors in all this section. Calls came to him from long distances, even as far as Logan County, and it is said that he buried as many as 1,100 bodies. He sold out to O. L. Ream, of Ada, O. He was a Republican in politics but never took any very active part in public affairs.

Mr. and Mrs. Agin have two daughters: Fairie M. and Maude Esther. The former is a very accomplished lady. She is a graduate of the Ohio Northern University at Ada and has taught piano music for six years. Her natural talent was developed so young that her parents had her given instruction in music when she was not more than six years old. The second daughter is in school. Mr. Agin and family are members of the Baptist church, in which he is very active and teaches the Bible Class in the Sunday-school. Like his late father he is a Republican. He has never desired political office but for six years consented to serve as appraiser for the Mutual Insurance Company.

HARRISON W. STOKER, of the firm of Stoker Bros., dealers in lumber, lath and shingles, who conduct a planing mill at McComb, O., was born in Allen Township, Hancock County, O., June 25, 1860, and is a son of Tunis A. and Eve (Mitchell) Stoker.

Tunis Stoker was born in Fairfield County, O., and was nine years old when he accompanied his parents, Jacob and Mary Stoker, to Hancock County, prior to 1835. Jacob Stoker bought a farm of 160 acres in Findlay Township, which he subsequently cleared and he died there about the time of the Civil War, his wife dying many years afterward. Of their five sons and three daughters, but one son is living. Cyrus, David and Darius all served in the War of the Rebellion, as members of Co. F, 21st O. Vol. Inf. Cyrus was killed at the battle of Stone River. David died of wounds received nine days afterward. Darius survived until the fall of 1908 although he had carried a bullet in his body all the intervening years. Of the other members of the family W. C. resides near Findlay and is a farmer. Mary Jane died unmarried. Dicey married Chrisley Grauel and died at Findlay. Athelinda died in 1907, in Portage Township and was the wife of John Hedges.

The maternal grandparents of Harrison W. Stoker were George and Rachel Mitchell, who came to Hancock County in 1832 and in the same year purchased a farm in Portage Township. They lived in their traveling wagon until they could cut down trees and clear a large enough space upon which to build their log cabin. They lived into extreme old age, reaching about ninety-one years. They had twelve children, those who survived infancy being as follows: Jacob, who died at Findlay, in 1907, had served as a soldier in the Civil War, in Co. F. 21st O. Vol. Inf.; George, who is a farmer, lives in Allen Township; Nancy, who is the wife of Eli King, lives in Portage Township; Rachel, who is the wife of Josiah Moore, lives in Pleasant Township; Betsey, who is deceased, was the wife of Henry Wright, of McComb; and Isabella and Mary Jane, both of whom are deceased, and Eve, the mother of Mr. Stoker, who died in 1883. Tunis Stoker died in May, 1910, in his seventy-eighth year.

Two sons and one daughter were born to Tunis Stoker and wife: Harrison W., George M. and Elizabeth. The latter married Eli Alexander and they reside in North Findlay. He was born in Richland County but was reared at Findlay and now fills the position of department foreman of the Findlay Clay Pottery Works. They have the following children: Jennie, Eve, George, Isabella, Ruth, Harold and Dora.

Harrison W. Stoker attended the public schools of Findlay Township and then learned the carpenter trade and worked at this at Findlay and Rawson and spent one summer in Kansas. In 1883 he came to McComb and entered into the furniture and undertaking business, with Wright & Griffin, and continued four years, when he resumed work at his trade until he started his present business. For the first two years he was alone and then his brother, George M. Stoker, joined him and they have developed

CALVIN D. TODD, M. D.

an extensive business and are now leaders in contracting and building at McComb.

In 1889, Harrison W. Stoker was married to Miss Maroa Mackey, a daughter of William Mackey, of Pleasant Township. They have two sons: William T., who is a lineman with the telephone company at McComb; and Clinton, who has not completed his education.

George M. Stoker, the other member of the firm of Stoker Bros., also learned the carpenter trade after his school days were over. He was married in 1866, to Miss Lillie Stout, a daughter of Madison Stout, of McComb, and they have two children, Fred and Lena.

The Stoker Bros. are not only associated as a firm but they agree politically and are identified with the same fraternal organizations. They both are members of the Masonic lodge at Deschler, the Odd Fellows and the order of Ben Hur, at McComb. They are Democrats in politics and Harrison W. Stoker for nine years was fire chief of the department at McComb and for fifteen years has been a member of the town council. They were reared in the Methodist faith.

WILLIAM J. FISCUS, tinner, roofer and sheet metal worker, at Findlay, O., has carried on his business at his present location, No. 116 North Main Street, since January 1, 1894, and controls a large amount of the best trade in his line. He was born in a village in Lucas County, O., not far distant from Toledo, bearing the name of Whitehouse, August 11, 1864, and is a son of Peter and Barbara Fiscus. They are both deceased, the father passing away when the son was about ten years old. The mother survived until in her eighty-third year and died in 1905, in Wood County, O.

William J. Fiscus was reared at Whitehouse and attended the village schools and when fifteen years old he went to Fostoria and there learned his trade with his brother-in-law, J. M. Schatzel. In March, 1883, he came to Findlay and worked at the tinning and roofing business until ready to embark in the same for himself. He has prospered and for some years has been contracting in tin, slate, roofing of all kinds, gravel, etc., and keeps four men constantly employed. He did the substantial work on the Argyle Block, the Marvin Block, the Lutheran church and other large structures and also on some of the city's finest residences.

Mr. Fiscus was married to Miss Emma Sterner, at Findlay, O., who was born in Hancock County and is a daughter of the late E. P. Sterner. Mr. Sterner was one of the old settlers in this section and was a veteran of the Civil War. Mr. and Mrs. Fiscus have two children: Helen and Edna. Mr. Fiscus is not active in politics, but he fraternally belongs to Lodge No 400, Knights of Pythias.

CALVIN D. TODD, M. D., who is successfully engaged in the practice of medicine at McComb, O., and is serving in the office of coroner of Hancock County, was born at McComb, January 27, 1878, and is a son of William H. and Eliza (Gault) Todd.

William H. Todd was born in 1837 and died in 1906. He was a son of Benjamin Todd, who was a soldier in the War of 1812 and afterward came to Hancock County. Benjamin Todd owned the land on which McComb now stands. William H. Todd was a cabinetmaker and undertaker for a number of years. He married Eliza Gault, who died in 1896

She was a daughter of Moses and Rachel Gault, who settled one mile west of McComb, prior to the laying out of the town by Benjamin Todd. The two families were subsequently connected by marriage and they were leaders in many of the early enterprises of this section, and were founders of the Church of God in this vicinity. Among the children of Benjamin Todd and wife were: William H.; Elisha, who is a venerable resident of McComb, being now in his eighty-seventh year; Benjamin, who lives in Kansas; and George, who died in Iowa, in advanced age.

To William H. Todd and wife there were born five sons and three daughters, as follows: Idona, who is the wife of John C. Buto, of Pleasant township, Hancock County; Melville, who is a merchant at Goshen, Ind.; Edward L., who is engaged in growing small fruits, at Viola, Del.; Jennie, who is the wife of H. C. Fry, of Blanchard Township, Hancock County; Calvin D.; Oliver L., who is connected with the McElhenny grain elevator at McComb; James H., who is a farmer in Pleasant Township; and Dora, who resides at home with her brother, Calvin D. Todd.

From the public schools of McComb, Calvin D. Todd entered the Normal School and for seven years afterward engaged in teaching school, a profession for which he seemed well adapted although it was not the one of his cherished desire. In 1903 he entered the Toledo Medical College and graduated in the class of 1907, locating immediately in his old home, McComb, where he has built up a substantial practice. In 1908 he was elected county coroner on the Democratic ticket and in the fulfilling of its duties, Dr. Todd has shown care, judgment and discrimination. He is a member of the county and Ohio State Medical Associations and also of the American Medical Association. He is identified fraternally with McComb Lodge No. 354, Odd Fellows; and with Camp No. 7470, Modern Woodmen of America. He is a member of the Methodist Episcopal church.

JOHN W. BAKER, postmaster at Rawson, O., and the owner of a valuable farm in Union Township, Hancock County, was born September 12, 1855, one-half mile south of Rawson, and is a son of Nathan E. and Elenore (Oman) Baker.

Nathan E. Baker was born in Lorain County, O., and was brought to Hancock County by his father, Joseph Baker, who was an early settler in Union Township. Nathan E. Baker followed farming all through his active life and died in 1900 at the age of seventy-seven years. He married Elenore Oman, who was born in Pennsylvania and was a daughter of Joseph Oman, who was one of Eagle Township's early settlers. She died in 1890, at the age of sixty-seven years. They were well known and highly respected people and are remembered in great kindness by those with whom their lives were spent.

John W. Baker attended the country schools and afterward gave his father assistance on the farm. In 1891 he was appointed assistant postmaster of the Rawson office, and in 1899, received his commission as postmaster and has made a very satisfactory official.

Mr. Baker has been a member of the Masonic Lodge at Rawson for the past fifteen years, and has held every official position in this lodge except Master, and at present is serving as its treasurer. Since 1880 he has also been identified with the Knights of Pythias at Rawson and has likewise been an official of this organization. He is a member of the Methodist Episcopal church. Mr. Baker has never married.

WILLIAM MANECKE, president of the Union National Bank of Fostoria, O., and owner of 600 acres of land in Hancock County, resides in a handsome residence that he erected in 1896, in Section 3, Washington Township. He was born in Philadelphia County, Pa., November 4, 1835, and is a son of Henry and Christina (Markley) Manecke.

Henry Manecke was born in Mecklenburg, Germany, where he had social and educational advantages and graduated from a German institution of learning. His family was one of importance and he was given a Government position, being made an inspector of farms. About 1828 he came to America and located in Philadelphia County, Pa., where he was interested in a sugar refinery. Several years later he moved to Stark County, O., where he rented a farm and four years afterward bought a farm in Section 10, Washington Township, Hancock County. This was about 1843 and at that time this whole county was yet heavily timbered. He built a log cabin in the forest and went to work clearing his land, apparently just as well satisfied notwithstanding his early advantages, as was any other pioneer. Straggling Indians often passed through the forests and game was still plentiful. He remained here until his death which occurred December 23, 1861. He married Christina Markley, who was born in Wittenberg, Germany, and came to America with her parents. She survived her husband some five years, her death taking place January 9, 1866. They had six children, namely: William Peter, who lives in Washington Township; Emma, who is the wife of Andrew Bowman, of Decatur, Ill.; Harmon, who lives in Colorado; Thomas J., who lives in Illinois; Frederick, who resides at Fostoria; and Albert, whose home is in Illinois.

William Manecke was quite young when his parents moved to Hancock County and as he grew up he assisted his father to clear the farm. His book knowledge was secured in the district schools and all his home influences were helpful. He followed general farming and took personal charge of the work as long as he continued actively interested and when he retired he turned his responsibilities over to his sons who, in the meanwhile, had grown into capable and reliable young men. He was one of the organizers of the Union National Bank at Fostoria, of which he is president. It operates with a capital of $100,000, and has a firm standing. E. W. Allen is vice-president and George A. Snyder is cashier. During the Civil War, Mr. Manecke was a patriotic citizen. In 1862 he enlisted in Co. K, 115th O. Vol. Inf., under Capt. A. R. Holland, and served faithfully until he was honorably discharged May 22, 1865. He took part in a number of sharp engagements and was one of the brave soldiers to march to the sea under Gen. Sherman, and on this march in December, 1864, he was wounded by the enemy and carried a minie-ball in his thigh for ten months and ten days. Through his bravery he was promoted to be sergeant of his company. He is a member of the G. A. R. Post at Fostoria.

In April, 1868, Mr. Manecke was married to Miss Susan A. Ernest, a daughter of Jacob Ernest. She died after the birth of their daughter, Della, who grew to womanhood and married Jacob D. Groth. Mrs. Groth died in South Dakota, and is survived by two children: Ruth and Reeve. On May 16, 1871, Mr. Manecke was married to Caroline C. Stout and the following children were born to them: Henry R., who died in November, 1907; Gilbert, who is an attorney at law, graduated from the Ohio State University at Columbus, in 1897; Thomas J., who married Anna Stauffer and they have two children—Florence and Leona; Rosa, who married Leila Ecker and they have two children—Helen and William; James F., who married Montana McDonald; Mrs. A. J. Crouse, who lives at Buffalo, N. Y., and Mae, who lives at home. Mr. Manecke is a member of the German Reformed church. He is one of Washington Township's prominent and representative men.

ROBERT W. CLOUD, justice of the peace in Portage Township, Hancock County, O., and a leading citizen of this section, resides on a small farm of three acres here and owns a farm of eighty acres situated in Paulding County, O. He was born at Columbus, O., September 24, 1834, and is a son of Samuel P. and Jane (Van Pelt) Cloud.

The father of Mr. Cloud was at one time a man of ample fortune, a part of which he earned by selling produce through the country. Later he owned and operated a hotel at Cincinnati, but subsequently was reduced almost to poverty through signing a bail bond for a friend which entailed the loss of $7,000, all at one time. Other men have done the same thing and have been equally unfortunate. Through this domestic calamity, Robert W. Cloud was separated from his kindred and was reared by strangers in Clermont County, until he was twenty-one years old. He then went back to Columbus, and worked there for seven years for an uncle, in a saw mill, and learned the lumber business.

In Franklin County, O., Mr. Cloud was married to Miss Catherine Miller, a daughter of a German farmer, Caspar Miller, and six children were born to them, namely: Robert Ethelbert, who died in May, 1901, leaving a family of three children, lived on a farm of 100 acres which his father formerly owned; Milan, who died in childhood; Warden W., who lives on the Paulding County farm, married there and has two children; Enoch, who lives with his family in Montana; Isolla, who married Franklin Huber, has one child, May, and they live at North Baltimore; and Alwilda Cretora, who married Perry Smith and they have two children and reside at North Baltimore.

Mr. Cloud is now one of Portage Township's substantial men, but in the building of his fortunes he has had little assistance. He has been a fireman on a railroad, a soldier, a farmer and a lumberman and has also filled public offices with the utmost efficiency. He is a veteran of the Civil War and has two honorable discharges, having served for three months in Co. G, 133rd O. Vol. Inf., and three months in a cavalry regiment, and is a member of the G. A. R. Post at McComb. Prior to coming to Hancock County and locating at Findlay, in 1869, he had spent some time and capital seeking a suitable location in Michigan, but not finding it came back to Ohio. At that time he had just $9.60 in cash, with a wife and four children depending upon him. He engaged in teaming as the first employment that offered and then went to work in a saw mill which stood on his present farm and later bought a half interest and subsequently the mill which he conducted for twenty-one years. He also acquired a farm of 100 acres which he retained until 1910, when he sold all but the three acres surrounding his residence. In politics he is a Republican and while living in Franklin County served seven years as constable. He was elected justice of the peace in Portage Township and has served in this office since January 1, 1910. He has also been township supervisor. He is identified fraternally with the Knights of Pythias.

HARRY G. DAVID, who does a large coal, transfer and storage business at Findlay, O., started here in this line in 1904, having F. D. Howe as a partner from then until July, 1909, when he bought the partner's interest and has been alone ever since. Mr. David was born at Cleveland, O., in 1875, and is a son of W. L. David, Sr.

The father of Mr. David died at Findlay in 1907. He early became connected with the hardware line of the oil business and continued through the oil fields of Pennsylvania until 1890, when he came to Findlay and up to the time of his death, was connected with the Jareeki Oil Well Manufacturing Supply Company.

Harry G. David was but a boy when the family moved from Butler, Pa., to Findlay, O., and later, for four years, he was connected with the oil industry, having leases in Cass Township, Hancock County, where he worked as a field foreman. Prior to accepting this position, however, he had learned the machinist trade, one that he followed for nine years. In 1904 he saw a good business opening in his present line at Findlay and took advantage of it and has greatly prospered. His coal office and yards are located at No. 418 East Lincoln Street, while his transfer and storage quarters are in the rear of No. 118 South Cory Street. He has a fine equipment, owning five large furniture vans, seven drays for heavy hauling, four coal and four road wagons, with strong teams, and gives steady employment to twenty-five men.

Mr. David married Miss Martha McKelvey, who is a daughter of S. L. McKelvey, a prominent real estate dealer, of Findlay, and they have one child, Francis Lee David. Mr. David is a member of the Knights of Pythias, B. P. O. E., and also of the Protected Home Circle.

GEORGE A. MITCHELL, who is engaged in general farming and stock raising on a tract of eighty acres in Allen Township, has resided on his present farm since 1870, and is the owner of two other farms in Portage Township, Hancock County, O., the three farms aggregating a total of 220 acres. He was born April 3, 1849, on a farm in Portage Township, Hancock County, O., and is a son of George and Rachel (Switzer) Mitchell.

George Mitchell was a native of Belmont County, O., and his wife of Richland County, O. They were married in Richland County, and immediately afterward came to Hancock County, O., and located on a tract of timberland in Portage Township. Here they continued to reside the remainder of their lives, he clearing the land and placing it in a state of cultivation. George Mitchell lived to the advanced age of ninety years, and his wife to the age of eighty-six years.

George A. Mitchell was reared in Portage Township, his father's farm being the scene of his boyhood activities. He has always followed farming, and in 1870, after his marriage, settled on his present farm of eighty acres, which is located in Section 35, Allen Township, lying along the road which separates Allen and Portage Townships. Here he has made many improvements, erecting a fine large frame house and barn, and other necessary buildings, and carries on farming in a general way, in connection with stock raising.

Mr. Mitchell was united in marriage with Abigail Cusac, who was born and reared in Portage Township, a daughter of John and Nancy (Bell) Cusac, and of their union have been born two sons: Homer, who resides on one of our subject's farms in Portage Township, married Stella Moorehead and has two children, Charles and Gertrude; and Harry, who lives on his father's other farm in Portage Township, married Nellie Peabody, and has two daughters—Gladys and Grace. Mr. Mitchell is a member of the Blanchard Presbyterian church.

LEVI GORBY, a well known citizen of Hancock County, O., is the owner of three farms, aggregating 140 acres, land being thus divided: eighty acres, on which he lives, in Section 18, Portage Township; forty acres, in Section 7, Eagle Township; and twenty acres in Section 13, Pleasant Township. He was born on a farm in Eagle Township, November 19, 1856, and is a son of Jacob and Maria (Frederickson) Gorby. Jacob Gorby was born in Chester County, Pa., and came to Hancock County as a child with his sister. He grew to manhood here and married Maria Frederickson, who died in 1858. Jacob Gorby spent the greater part of his life in Eagle Township, where he followed farming, but his death took place at Rawson.

Levi Gorby followed the example of his father and has been a farmer ever since reaching the age of responsibility. For six years after his first marriage he remained in Blanchard Township on rented land and then moved to the homsetead in Eagle Township. He spent fourteen years in that township and came to his present farm in Portage Township in March, 1898.

Mr. Gorby was married first to Miss Flora Powell, who died in Eagle Township. They had three children: Cora, deceased, who was the wife of Charles W. Gorrell and is survived by two children—Ruby and Carl; Estella, who is the wife of W. J. Swinehart, and has one child, Harold; and Viola, who died aged 4 years. In January, 1891, Mr. Gorby was married to his present wife, who was Miss Celesta Bond, a daughter of Jesse Bond, and they have two children, Erma and Earl DeLoss. Mr. and Mrs. Gorby are members of the Thomas Methodist Episcopal church, in which he is a class leader, steward and trustee and also a teacher in the Sabbath-school. In the same year that Mr. Gorby moved to Portage Township he was elected township treasurer and he served in that office until January 1, 1910. He has also been a member of the school board and in every way has shown the qualities of good citizenship. He is identified with the order of Maccabees.

DAVID DICK, whose valuable farm of 240 acres lies in Washington Township, in Section 21, divided by the general highway, is one of Hancock County's substantial citizens and representative men. He was born on his father's farm in Richland County, O., May 28, 1836, and is a son of George and Sarah (Nickles) Dick.

George Dick was born in Pennsylvania and was a son of Simon Dick, who was a native of Germany. The latter came to America and settled in Pennsylvania where he married and reared a large family. Of these George was one of the younger sons. He remained on the Pennsylvania farm until after his marriage and the birth of three children, and then moved to Wayne County, O., where he rented a farm and moved from there to Stark County where he also rented land, after which he moved to Richland County and there bought ninety acres of land and resided on it into old age, being aged ninety-one years at the time of death. His wife had passed away earlier, when aged eighty-six years. The record of their children is as follows: Eliza became the wife of William Boyd and both are deceased. Josiah is deceased. Harmon lives in Shelby, O. Levi, George and Jacob, are all deceased. Sarah Ann married Samuel Smith and is now deceased. Mary Ann is also deceased. David and Hiram were twins and the latter is deceased. Susann, now deceased, was the wife of Samuel Turpet.

David Dick grew up on the home farm and he easily recalls the old schoolhouse with its primitve accommodations. He remembers also that he and his seat-mate built their own desk. From boyhood he was accustomed to farm work and after he was married he continued to work on the home farm for his father for four years and then came to Hancock County, where he purchased his first land, a tract of fifty-three acres situated one mile east of his present farm, the former owner being H. Hunt. To this he added fifteen acres but subsequently sold out and went back to Richland County, where he bought 165 acres. That he subsequently traded for his present farm, with Josiah Dick, this being in 1876. A log house then stood on the place but Mr. Dick built all the buildings now standing, cleared up about thirty acres and put it under cultivation with the remainder of the land, had it all thoroughly tiled and for years has successfully followed general farming. He is one of the stockholders in the bank at Arcadia, O.

On March 11, 1862, Mr. Dick was married to Miss Barbara Weiser, a daughter of Adam and Susan (Bender) Weiser. The father was born in Dauphin County, Pa., and the mother in Cumberland County, and both came to Ohio with their parents, Mrs. Weiser being then eleven years of age. Her parents settled near Mansfield, O., and it is said that when they went to take possession of the cabin on the farm, a deer ran out of it, the wild creature having taken shelter there. Until they could get their own house comfortable they lived with a Mr. Weiler, one of the well known pioneers. The Weiser family entered 160 acres of land in Richland County, near Shelby. Mrs. Dick is one of a family of twelve children, namely: Sarah Jane, who died at the age of five years; Barbara, who is the wife of Mr. Dick; John, who is deceased; Harriet, who died when aged sixteen years; Jacob, who lives in Williams County, O.; Adam, who is on the old home farm in Richland County; William, who lives at Fostoria; Alice, who is the wife of William Sherman of Fostoria; Mary, who is the wife of George Suter, an undertaker at Shelby, O., and two who died in infancy.

Mr. and Mrs. Dick have four children: George Wesley, Cora, Adam and Charles

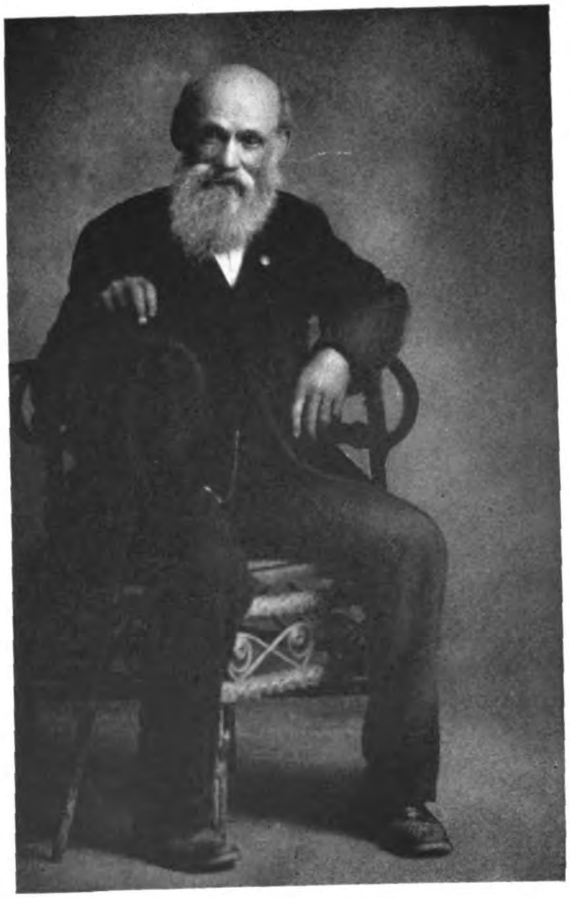
F. George Wesley Dick is secretary of the Mutual Insurance Company and secretary of the bank at Arcadia, of which he was one of the organizers and has a half interest in a threshing business. He married Jessie Taylor and they have six children. Their eldest daughter, Ethel, took a Normal School course and is now teaching in the home district where her father taught several terms. Lulu and Nellie are both students in the Arcadia High School, while John E., Anna and Bessie H., are at home. Cora, the only daughter of Mr. and Mrs. Dick, is the wife of Alvin Davison and they reside at Fostoria. Having no children of their own, they have adopted a son and he has been theirs from the age of seven weeks. Adam Dick, who owns a half interest in the threshing business, resides in a part of his father's house and operates the home farm. He married Nannie Wyant. Charles F. Dick, the youngest son, is also in the threshing business and lives in Washington Township. He married Nellie Need. The Dicks are identified with the Democratic party.

ARTHUR N. McNEAL, who is engaged in farming and stock raising on a tract of eighty acres which his wife owns, located about five miles south of Findlay on the Washington road, in Section 3, Eagle Township, Hancock County, O., is also engaged in road contracting, and was born on his present farm August 21, 1848, a son of John Parks and Catherine (Swisher) McNeal.

John P. McNeal, a native of Pennsylvania, came to Hancock County in 1862 and entered a tract of eighty acres in Eagle Township, from the government. He lived upon and farmed this land until within a few years of his death, when he removed to Findlay, O., where he lived in retirement until the time of his decease, October 22, 1890. His wife, who in maiden life was Catherine Swisher, was also a native of Pennsylvania and died on the farm in Eagle Township in 1870.

Arthur N. McNeal has spent his entire life on his present farm, and attended the local schools of Eagle Township. He has always followed farming in a general way, and raises considerable stock, including hogs, sheep, cattle, horses, etc., but devotes most of his time to road contracting and has built a great many of the best turn pike roads in the county. He has made extensive improvements on the farm in the way of tiling, ditching, etc., and in 1906 erected a large frame residence.

In 1869 Mr. McNeal was joined in marriage with Elizabeth Briggs, who is a daughter of Raymond and Margaret Briggs, both natives of Pennsylvania. Mrs. McNeal was but six years old at the time of the death of her father, who was a sailor, and she afterwards came to Hancock County with her mother, who located at Findlay. Four children have been born to Mr. and Mrs. McNeal, namely: John H.; Grace E., who married John Ecker, who comes of one of the prominent families of Hancock County; Blanche M., who is the wife of Lorison Stanfield, who comes of a well known family of Wood County, and they have one son, Everett J.; and Cora Dell, who died at the age of three years, nine months and eleven days.



WILLIAM JORDAN

WILLIAM JORDAN, one of the honored old soldiers of the Civil War, one of the first to enter the service of his country when her defenders were summoned in 1861 and only leaving after more than three years of hardship had brought on serious disabilities, is one of the best known and most esteemed residents of Washington Township, Hancock County, O. His comfortable frame residence stands on his little farm of fourteen acres, not far from the village of Arcadia. He was born in Tuscarawas County, O., January 19, 1833, and his parents were Charles E. and Margaret (Moore) Jordan.

Charles E. Jordan was born near Stillwater on the Ohio River when this great commonwealth was yet a territory. The names of his parents have not been preserved but when he was small they moved down the river below Wheeling and there he grew to manhood and learned the shoemaking trade. He worked there at his trade and also engaged to some extent in farming and there married Margaret Moore, the daughter of a neighbor. Some time later they moved to Tuscarawas County, O., settling in the woods six miles southeast of New Philadelphia and lived there until the fall of 1835 when they moved to Hancock County. The father entered 160 acres of Government land at that time and later 160 more lying east of his first farm. No clearing or improving of any kind had yet been done, the land lying as a virgin wilderness and therefore the family had to live in the wagon until the father could clear a site and then erect his log cabin. At that time there was plenty of game in the forest, a few wild hogs running through the underbrush and fattening on the nuts from the trees, while deer and wild turkey were not difficult to shoot. Thus, in those early days, there was no lack of food or fuel, nor of shelter, the three great necessities which each year in modern life and civilized communities are the most difficult for the poor man to procure.

Charles E. Jordan in the course of time cleared up his land and enjoyed the result of his many years of hard work. Before his death he retired to Findlay and there he passed away in old age. His first wife died on the farm and he later married a widow by the name of Mrs. Winders. She had several children born to her first marriage but none to the second. To Charles E. and Margaret Jordan the following children were born: Daniel, Martha, William, John M., Nancy Jane, James, Charles Wesley, Mary and Robert D. Of the above family five sons were in the Civil War. William served in the 49th Ohio. John M. was in the 57th Ohio, and is deceased. James, who was killed May 27, 1864, at the battle of Peach Tree Creek, was a member of the 49th O. Vol. Inf. Charles Wesley, who is now deceased, served as a member of the 57th O. Vol. Inf. Robert D. was also a member of the 57th Ohio. Nancy Jane is the wife of Michael Steelsmith. Martha and Mary are both deceased.

William Jordan recalls many events of his childhood in this section but he was too young to remember the wagon journey here from Tuscarawas County. He remembers his childish interest in the forming and drilling of the local militia which took place on his present farm. As soon as he grew old enough he had farm tasks to perform, his school attendance not exceeding two months in the year. When he reached the age of sixteen years he decided to learn a self-supporting trade and being somewhat accustomed to leather on account of his father's shoemaking business, he concluded to also learn a leather trade, hence served an apprenticeship with Capt. John Poorman, a well known saddle and harness maker at Tiffin, O., and he followed this trade until the outbreak of the Civil War, which found him at Cedar Rapids, Ia., where he had been with G. W. Westlake for six years.

Mr. Jordan was one of the first volunteers to offer himself as a private in the First Ia. Vol. Inf., but was not accepted on account of being lacking in required height for that regiment. He then returned to Ohio and enlisted in Co. A, 49th O. Vol. Inf., under Col. William Gibson and he continued in the service for three years, three months and thirteen days, during this time participating in the long and weary marches and innumerable skirmishes and such notable battles as Shiloh, Stone River, Chickamauga, Missionary Ridge and Nashville. He was then attacked with measles and was made so seriously ill that he was confined for some eight months in different hospitals and very nearly lost his eyesight. After receiving his honorable discharge, Mr. Jordan returned to Hancock County and again visited Iowa and possibly might have remained there, finding excellent business prospects in buying and selling land, but the brisk western wind affected his eyes to such an extent that he decided it to be the part of wisdom to return to Ohio.

After his return to Hancock County, Mr. Jordan bought 160 acres of land in Cass Township and kept adding farm after farm until he had taxes to pay on 288 acres of land. He carried on farming and sheep-raising until March, 1903, when he sold out and came to his present place where he has enough land to keep him pleasantly occupied in its cultivation without taxing his strength. Formerly he did considerable business in shipping cattle and hogs together with dealing in sheep but no longer pays attention to these industries. He greatly improved his present place and erected his frame house and other substantial buildings. He has always been deemed a good business man and is a stockholder in the Arcadia Bank at Arcadia, O.

On July 27, 1876, Mr. Jordan was married to Miss Mary Dietz, a daughter of Joseph and Caroline (Nunemaker) Dietz. They came to Hancock County from New Jersey when Mrs. Jordan was small. Four children were born to Mr. and Mrs. Jordan, namely: Margaret, who died young; Martha May, who married Ridgeway Anderson, and they have five children—William, Dale, Frances, Charles and Arlouine; Charles, who married Bessie Taylor; and Sarah, who is the wife of Verne McCracken. Mr. and Mrs. McCracken have the following children: Delmar, Arthur, Esther, Laverne and Hartley Howard. Mr. Jordan and family are members of the Lutheran church. In his views on public questions Mr. Jordan is a strong Republican but he has never been willing to accept public office although he is well qualified for the same and is so esteemed by his neighbors that the affectionate title of "Uncle Billy" is very generally accorded him. He is a valued member of Norris Post, Grand Army of the Republic at Fostoria and takes much interest in army matters. Mr. Jordan possesses a fund of interesting reminiscences. He has seen wonderful changes since 1858 when he drove across country from Arcadia to the city of Denver.

THOMAS W. LANG, who is serving in his third term as city solicitor of Findlay, O., is recognized as an able member of the Findlay bar. He was born in Cattaraugus County, N. Y., April 15, 1882, and is a son of Charles and Anna (Curtis) Lang. Charles Lang is a well known gas and oil contractor at Findlay and one of Hancock County's substantial citizens. He came to Findlay from New York in 1889.

Thomas W. Lang attended the Findlay schools and was graduated from the High School in 1900 and from the business department of Findlay College, in 1902, when he entered the Ohio State University where he took a complete law course and was graduated in 1904. He located at Findlay and soon built up a very satisfactory practice and so demonstrated his legal ability that he was selected two years later on the Republican ticket, city solicitor. He occupies well appointed offices in the Adams Building, Findlay.

Mr. Lang was married to Miss Maud Marion Boehmer, a daughter of A. Boehmer, formerly of Findlay, now residing at Los Angeles, Calif. Mr. Lang is a member of the Elks, the Knights of Pythias and the Modern Woodmen.

PHILIP SCHALLER, whose well improved farm of 118 acres is situated in Section 6, Van Buren Township, Hancock County, O., has always lived here, it being the old homestead. He was born in the old log cabin that then stood on the farm, February 15, 1833, and is a son of Christian and Mina (Bower) Schaller.

Christian Schaller was born in Germany and was twenty-one years of age when he came to America. He was a farmer all his life and spent many years of it on the present farm in Van Buren Township, dying here when aged seventy-eight years. He married Mina Bower, a daughter of William Bower. She died when aged forty-two years and both she and husband were buried in the Van Buren Township Cemetery. They were members of the Lutheran church. Christian Schaller was a strong Democrat in his political views. They had five children.

Philip Schaller obtained his education in the district schools. From boyhood he has filled a man's place on the farm and much of the excellent condition of the land may be attributed to his careful cultivation of it for so many years. His flocks and herds compare favorably with others in this section and he is regarded as one of the most successful farmers of the township. In 1884 he erected his present comfortable residence and in 1897 put up the commodious and substantial barn. In politics, Mr. Schaller is a Democrat. He has never accepted any township office, finding the care of his farm sufficiently important and demanding the larger part of his time.

Mr. Schaller married Miss Margaret Bower and they have five children: Jacob, William, Charles, Mary and Barbara. Mr. Schaller and family belong to the Lutheran church, in which he is a deacon.

HIRAM COOPER EWING, a lifelong resident of Hancock County, O., a member of an old and honorable family, owns one of the best improved farms in Pleasant Township and is one of its most substantial men. He was born in Liberty Township, Hancock County, O., April 12, 1863, and is a son of Jacob and Louisa (Cooper) Ewing.

Jacob Ewing, father of Hiram C., was born August 16, 1836, in Ashland County, O., and accompanied his parents to Hancock County in 1854. They were Jacob and Sophia (Mowery) Ewing, natives of Pennsylvania. They had accompanied their parents to Ashland County and were married there and when they came to Hancock County settled in Liberty Township. Grandfather Jacob Ewing first bought 160 acres and later added to it until he owned 300 acres. His death occurred in 1866, on the farm now owned by Jeremiah Ewing and his widow survived him but a short time. They had seven children, as follows: Cornelius, a resident of Findlay; Julia Ann, widow of Elijah Goudy, also of Findlay; Philip, of Pleasant Township; Rudolph, also of Pleasant Township; David, who died in the Civil War; Jacob; and Elmira, widow of Richard Boyd and a resident of Findlay.

In 1859, Jacob Ewing of the above family, was united in marriage with Louisa Cooper, a native of Licking County, O., a daughter of Hiram and Louisa (Miller) Cooper. Her father died in 1883, in Blanchard Township, but her mother lived until August 9, 1901, her age being 100 years and sixteen days. To Jacob Ewing and wife the following children were born: Ella, who resides at Deweyville, O.; Erwin E., formerly sheriff of Hancock County, resides at McComb; Hiram C.; Earl, a farmer, who resides with his sister at Deweyville; Charles, who owns and operates a farm near Deweyville; and Jennie, who died at the age of two years. After marriage, Jacob Ewing remained for some years in Liberty Township and then exchanged his farm there for eighty acres in Pleasant Township, coming to the farm on which Hiram C. Ewing lives, in 1878. He died in the same spring, being then in his forty-second year. His widow survived until 1904, she being sixty-eight years of age.

Hiram Cooper Ewing attended District No. 1 school in his boyhood, this being in Pleasant Township. He assisted on the home farm and also worked in the tile business and also in getting out timber, but has made farming his main business. He owns eighty acres of valuable land and he has put many improvements here although it was in fair condition when he came into possession. He is regarded among his neighbors as an unusually successful farmer.

Mr. Ewing was married in January, 1888, to Miss Metta Bolton, a daughter of Michael and Elizabeth (Shepler) Bolton, the former of whom died in 1883 and the latter of whom has reached her eighty-third year. Mrs. Ewing was reared in Liberty Township, the youngest of four children, the others being: Hattie, who is the wife of P. J. Gross, of Findlay; Elizabeth, who is the wife of William Browneller, of Deweyville; and Jacob, who is a carpenter by trade and a resident of Findlay. Mr. and Mrs. Ewing have four children: Lloyd Ernest, born in 1888; Troas, born in 1891; Lee Bolton, born in August, 1899; and Ralph Cooper, born in 1901. Mr. Ewing and family are members of the Church of God. In politics he is a Democrat.

FRANK L. MILLER, one of Amanda Township's most substantial citizens, owning 240 acres of valuable land situated in Sections 5 and 8, was born on this farm, in Amanda Township, Hancock County, O., October 10, 1868. His parents were Jones R. and Mary (Gilbert) Miller.

Jones R. Miller was born in Chester County, Pa., in 1830, and was a son of Henry Miller, who was also a native of Pennsylvania. He first married Margaret Carver of Hancock County, and her death occurred here. After the death of his first wife, Jones R. Miller married Mary Gilbert, who was born in 1823, in Baltimore County, Md., and died in 1905, aged eighty-two years, his death taking place in the same year, he being aged seventy-five years. They were parents of four children, namely: Thomas G., who was accidentally killed on the railroad in 1892; D. J., who died in his sixth year; Eliza, who is the wife of John F. Hoy, of Vanlue, O.; and Frank L. By his first marriage he had one son, William. Jones R. Miller came to Amanda Township in 1854 and purchased the farm which his son, Frank L., now owns. He erected here the first brick house in the township and did all the construction work himself.

Frank L. Miller was educated in the schools of Vanlue, and at Findlay College and Delaware College, and was graduated from the last named institution, after which he taught school for four years. Mr. Miller then turned his attention to farming and has found an agricultural life perfectly satisfactory. He carries on a general farming line and grows livestock.

In 1895, Mr. Miller was married to Miss Cora F. Spangler, of Wyandot County, O., and they have two children: J. Lee and Helen. They are members of the Methodist Episcopal church and for more than twenty years he has been superintendent of the Sunday school. In politics he is a Democrat and has occasionally accepted township office and has served acceptably as assessor and as trustee. He belongs to Lodge No. 710, Knights of Pythias, at Vanlue.

JAMES LONG, senior member of the firm of Long Bros., conducting a livery and feed stables at Findlay, and a quick transfer line, is continuing an enterprise which was founded here by his well known father, J. W. Long. James Long was born on a farm in Eagle Township, Hancock County, O., in 1874.

In 1875, John W. Long moved to Dunkirk, O., where he embarked in a livery business which he continued until 1890, when he removed to a farm in the vicinity of Dunkirk, but in 1893 he came to Findlay and in the following year founded the present business in partnership with his son, James Long, under the firm name of J. W. Long and Son. In 1900, another son, R: J. Long, entered the firm, and the partnership continued until 1909, when J. W. Long retired and bought the Standard Livery. He occupies a substantial two-story brick building on West Sandusky Street and devotes his time mainly to the buying and selling of fine horses and conducting a feed stable. He has been in the livery business for thirty-five years.

James Long was practically reared in his present business as he became associated with his father as soon as he left school. Prior to 1902 the main business was confined to the conducting of a first class livery but at that date the firm broadened out and entered also into funeral work, investing in all necesasry accommodations for the same and now own ten rubber-tired hacks suitable for funerals. They also have fine vehicles for hire for other purposes, and keep several hacks which meet all trains for transporting both travelers and their luggage and also do a general transfer business, keeping from thirty to forty head of horses all the time. Their stables and warehouse are situated in the rear of the Phoenix Inn.

James Long was married to Miss Viola Werts, of Findlay, O., and they have two children: Robert Neil and Annabelle. Mr. Long is a member of the Knights of Pythias and the Elks. He is numbered with the progressive and public spirited men of Findlay.

ELIAS FOX, who resides in Section 13, Washington Township, Hancock County, O., is one of the capitalists of this section, being interested in banking institutions and owning 1,000 acres of land which is divided into easily cultivated farms, the most of them being occupied by his children. He was born in 1834, in an old log house that stood on the home farm in the woods, on Section 12, Washington Township, Hancock County, and is a son of William and Elizabeth (Whaley) Fox.

William Fox was born in Pennsylvania and after his first marriage he came to Fairfield County, O., where he rented land. From there he moved to Seneca County, where he cleared up a small farm south of Tiffin, O., and thereby made enough money to enable him to enter eighty acres of land in Hancock County, in 1832. He was a man of business foresight and resource and to his eighty acres he added forty more by clearing up twenty acres for Isaac Wiseman, which he did with the help of his older sons. When William Fox settled first in Section 12, Washington Township, he hastily put up a plain log house which later gave way to a hewn log one and this in turn to the brick house which is still standing. He was known to every one in the neighborhood and was called "Uncle Billy" in friendliness. After the death of his first wife he married Elizabeth Whaley, a lady of Scotch descent, who died in 1837, leaving two children: Isaiah and Elias, the former of whom died at the age of nineteen years. The third marriage of Mr. Fox was to Elizabeth Jacobs, who died without issue. He married Catherine Mailes for his fourth wife, and they had a large family, of whom there are two still living—Nicholas, of Hancock County, and Milton, of Seneca County. He survived his last wife, his death occurring in 1871, when he was aged seventy-nine years.

Elias Fox grew to manhood on the old farm which he helped to clear and spent some of his boyhood days in the old log school house, one of the primitive kind, with slab benches, puncheon floor and great fireplace which had to be supplied with fuel by the boys who brought logs in from the forest. After he reached manhood he spent a few years in Wisconsin and after he came back entered his first tract of land, forty acres. He kept it until he was able to sell at a profit of about $400, and this was the capital with which he started his business operations which have grown to be so important. Just before he married he bought thirty-seven acres in Section 13, Washington Township, paying $27 an acre, and in a log house there he and bride commenced housekeeping. For many years he carried on general farming and did much business also in shipping stock. He has believed in improving his land and on almost all the farms he has put up good buildings and has laid, in all probability, 200,000 tiles. He is a stockholder in the bank at Bradner, O., and was one of the organizers of the Union National Bank at Fostoria, of which he is a director.

On March 22, 1860, Mr. Fox was married to Miss Louisa Felkley, a daughter of William and Catherine (Fritcher) Felkley. The parents of Mrs. Fox were born in Germany but were not married until they met in Pennsylvania, where Mrs. Fox was born. She was fourteen years of age when her parents came to Washigton Township, Hancock County. Nine children have been born to Mr. and Mrs. Fox, as follows: Amelia, now deceased, was the wife of Andrew Coleman and two children survive her—Emma and Della, the latter of whom is the wife of David Hines; Charles married Nellie Greene; Bailey married Lela Kiser and they have three children—Harold, Ray and Alverta; Clara is the wife of Fred Crannell; John married Cora Grubb and they have two children—Clarence and Howard; Curtis A. married Sophia Burroff and they have five children—Rosetta, Marcella, Janetta, Ruth and Helen; William, who is unmarried; Lulu, is the wife of Charles Good; and Elias, who married Iva Kendell. They have one son, Alfred. Mr. and Mrs. Fox have the satisfaction of having all their children, with one exception, settled near them in Washington Township. Clara, Mrs. Crannell, lives at Johnstown, Pa. In politics, Mr. Fox is a Democrat. He has served in township offices, being township trustee for three terms. Mr. Fox has become a man of large estate through frugality and good business judgment.

CYRUS HENRY CARR, one of the leading agriculturists and representative citizens of Allen Township, Hancock County, O., is the owner of two tracts of farm land, one of 140 acres on which he lives, is located in Section 20, and the other of twenty acres is located in Section 19. He was born Angust 8, 1853, in a log house, which was situated on a portion of his present farm, and is a son of Charles Wesley and Rebecca (Barnd) Carr.

Charles Wesley Carr was born in Ashland County, O., and when a boy came to Hancock County, where he always followed agricultural pursuits, and died on the farm in Allen Township, August 1, 1909, aged eighty-four years. He married Rebecca Barnd, whose death occurred in 1899, and who was a daughter of John Barnd, one of the pioneers of Allen Township and a justice of the peace for over twenty years.

Cyrus Henry Carr has always lived on his present farm and has made farming his life occupation. On June 27, 1907, a fine large barn and the residence of our subject were entirely destroyed by fire, but have since been replaced by new and commodious structures. Mr. Carr married Sarah V. Taylor, who was born and reared in Allen Township, and is a daughter of Washington Taylor. Mr. and Mrs. Carr have the following children: Linne E., who died aged twenty-seven years; Harvey O., who married Mary Brust and has two children—Bernadine and Genevieve; and Estella, who is the wife of Paul Goeke, resides at home with her parents. The religious connection of the family is with the Van Buren Presbyterian church.

SAMUEL SNIVELY, a leading citizen of Portage Township, and one of the successful farmers and stock raisers of Hancock County, owns eighty acres of fine farm land in this township and also a second farm of eighty acres which lies in Section 10, Pleasant Township. He resides on the first mentioned farm, all of which with the exception of three acres in Section 29, lies in Section 20, Portage Township. Mr. Snively was born at London, Madison County, O., February 26, 1853, and is a son of John and Margaret (Barnhart) Snively.

The parents of Mr. Snively were natives of Pennsylvania. They came to Ohio and lived for a short time in Madison County but moved to Union County when Samuel was a babe and there the father followed his trade of wagonmaker. The mother died in 1861 and the father in the following year.

Left an orphan when nine years old, Mr. Snively had but few of the pleasures and advantages that the normal boy craves but what he lost in some ways perhaps he gained in others. He grew up self reliant and as soon as old enough learned the carpenter's trade, which proved to be one of the best steps he ever took. With his kit of tools and the knowledge of how to use them, he has traveled over a large part of his native land and has left specimens of his handiwork in fifteen states of the Union. His journeying took him all over Pennsylvania, Virginia, Maryland, New York, Ohio, Kentucky, Indiana, Michigan, Illinois, Iowa and Kansas and on even to the Black Hills. At Buffalo, N. Y., he was foreman for a time for a large lumber firm and in 1880 came from there to Hancock County to buy timber. The first tract he purchased was the farm adjoining the one he now owns and it was while on this business expedition that he first met the young lady who subsequently became his wife, their marriage taking place in the following year. For one year after he continued in the lumber business and then rented the farm which he has subsequently acquired, with the intention of settling down to an agricultural life, but shortly afterward his house was burned and he lost practically all he owned here. He then moved to the Wood County line where he bought eighty acres of woodland, but for good reasons he remained there but a short time and then removed to what was the Samuel Culp farm in Portage Township. However, prosperity did not attend him and so he turned again to the excellent trade which had previously proved so valuable an asset. Leaving his wife with substantially every cent of his money, he again shouldered his kit of carpenter's tools and set his face toward the West. Within one year Mr. Snively sent for the waiting wife who immediately joined him and for twelve years afterward they lived on a farm in Nebraska and prospered there.

In 1896 Mr. Snively returned to Hancock County on a visit and old home associations proved too strong. He purchased the farm of eighty acres in Portage Township on which he now resides. It was unimproved and all the substantial and appropriate buildings now standing thereon were erected by him as rapidly as possible. When he sold his farm of eighty acres in Nebraska, he bought his eighty-acre farm in Pleasant Township.

Mr. Snively was married in 1881 to Miss Rachel Montgomery, a daughter of George W. Montgomery. Her father was an auctioneer in Portage Township who had much more than a local reputation and he also was postmaster at Portage Center, which was the second post-office established in Hancock County. Five children were born to Mr. and Mrs. Snively, namely: Elmer F., Edna I., Ethel Fern, Dorothy and Lottie M. Elmer F. Snively resides on his father's farm in Pleasant Township. He married Jessie Pingle, who died April 20, 1910, and is survived by a son, Cloyce, who is now aged eighteen months. Edna I. is the wife of T. E. Bond. Dorothy is the wife of Clarence Freed. Elmer Snively is known all over this section, having been a popular school teacher for some years and later mail clerk on the C. H. & D. Railroad. Neither he nor his father are very active politically but they are numbered with the reliable, de-

MR. AND MRS. JASPER F. HARRY

pendable men of this section of Hancock County.

JASPER F. HARRY, one of the substantial farmers and much esteemed citizens of Allen Township, who resides on a farm of 76 acres about four and a half miles north of Findlay, has been living on this farm since 1869. He was born November 8, 1836, on a farm four miles east of Van Buren in Cass Township, Hancock County, Ohio, and is a son of Samuel and Rachel (Franks) Harry. His parents were both born and reared in Pennsylvania, and after their marriage located in Hancock County, where the father died when our subject was very young. The mother subsequently removed to Seneca County, Ohio, where she settled on a farm, and many years later married William Myers, who died about 1856. Our subject and mother then returned to Hancock County and located for a time on a farm one mile northwest of his present place. In 1869 they purchased the farm on which Mr. Harry now resides, and the mother later removed to Van Buren, where her death occurred.

Mr. Harry has made all of the improvements on his place, and erected his fine frame residence in 1889. When gas was first discovered in this locality, it was struck on his farm, and he received $1,500 a year as royalty for it. He now rents out his farm, and is taking a well earned rest after years of unceasing activity.

In 1871 Mr. Harry married Sarah Jane Decker, a daughter of Mahlon and Minerva (Dull) Decker, who in their day were very prominent citizens of Allen Township. To Mr. and Mrs. Harry were born the following children: Lilly Adosia, died aged nineteen months; Maud Nora, who is the wife of Burgett Murray of Findlay, and has two children, Margaret and Caroline; Charles B., who is engaged in agricultural pursuits on a farm three miles east of Van Buren in Cass Township; Edith, who died aged two weeks; and Augusta, who is the wife of Franklin Spaythe, of Akron, Ohio.

JOSEPH ALGE, junior member of the firm of Alge Brothers, well known stone, concrete and brick contractors of Findlay, O., was born February 24, 1869, in Martinstown, Hancock County, O., and is a son of Joseph and Theresa (Beck) Alge.

Joseph Alge, Sr., was born in 1839, in Baden, Germany, and when eighteen years of age came to America and settled in Hancock County, O. He first located in Martinstown, where he purchased forty acres of land, and in 1871 went into business in Findlay Township, where he operated a brick yard near Findlay and in 1888 came to Findlay, where his death occurred February 16, 1910. He was one of the prominent pioneer contractors of this city, having followed that business here since previous to the Civil War. He was contractor for many of the dwellings and business blocks of Findlay, the last building for which he contracted having been the Karst Block of this city. One son, Charles Alge, was associated in business with him from 1884, and ten years later his son Joseph became a member of the firm. Mr. Alge was the owner of 268 acres of fine farm land in Hancock County at the time of his death, having made investments not many years after locating in the county. He married Theresa Beck, who is still living.

Joseph Alge, the subject of this sketch, was reared west of Findlay, O., where his parents located when he was about four years old, and he began working in the Alge brick yard when about eighteen years of age and continued working there until 1894, when he became identified with his brother in the contracting business at Findlay, O., and has since been junior member of the substantial firm of Alge Brothers, stone, concrete and brick contractors.

Mr. Alge was joined in marriage with Mary Cahill, and of their union have been born five children: Edwin J., Mary, Verna, Lewis, and Robert. Lewis died aged twenty-five months.

Mr. Alge is a Democrat politically and served two years as a member of the city council. He is a member of the Catholic church, and belongs to the Knights of Columbus.

CYRUS F. KING, M. D., who is the only registered drug physician in Hancock County, O., has been in active practice at Mt. Cory, since the summer of 1895 and is one of the best known members of his profession in this section. He was born in Portage Township, Hancock County, January 26, 1855, and is a son of John and Louisa (Hart) King.

John King, who is probably the oldest resident of Hancock County, was born in Ashland County, O. In earlier years he taught school through Portage and Liberty Townships and for many years resided near McComb. He married Louisa Hart, also of Ashland County, who died July 10, 1898, at Findlay.

Cyrus F. King was reared in Portage Township and obtained his early education in the old No. 9 district school, after which he completed the school course at Findlay. He started to read medicine with Dr. Watson, a practitioner at that time at McComb, and from under his instruction entered the Eclectic Medical College at Cincinnati, where he was graduated June 8, 1878. He started into practice at Arlington, O., where he opened the first drug store, also opening the first one at Mt. Cory, and maintained his home at Arlington for seventeen years. He came to Mt. Cory, June 19, 1895, and has been a leading citizen, serving as mayor of the town for two years, and for two years was a member of the town council. He was a member of the board of pension examiners at Findlay, for ten years.

Dr. King was married December 17, 1876, to Miss Manerva Porter, a daughter of Amos and Sarah (Comer) Porter, the former of whom died April 6, 1899, and the latter August 9, 1900, near Findlay. To Dr. and Mrs. King a family of twelve children was born, as follows: Dwight J., who formerly was superintendent of schools at Vanlue, O., for four summers has been attending the Illinois Medical College at Chicago, married May Brenneman of Mt. Cory and they have two children—Ralph and Wendell; Alvin E., who, for the past year has been a student at his father's old college, formerly taught school for five years at Van Buren, one year in Orange Township and four years in Union Township, married Coza M. Light, of Mt. Cory; Merrell S., who also studied medicine at Chicago, Ill., married Ida Hubler, of Mt. Cory; Bessie, who died September 22, 1906, at the age of twenty years, was a teacher in Cass

Township; Wade, who is a student at the Ohio Normal University at Ada, O.; Carrie, who is employed in the Farmers' Bank of Mt. Cory; Marco, Sarah, Martha and Mary, who are at home; and two who died in infancy. Three sons: Merrell S., Dwight J. and Alvin E. are attending the Eclectic Medical College at Cincinnati. A number of Dr. King's children have been successful teachers and for five years before entering on medical practice he taught school in Blanchard, Pleasant, Liberty, and Findlay Townships. The family is an unusually intellectual one. They are members of the Evangelical church at Mt. Cory, Dr. King being one of its trustees. In politics he is a Republican. He is identified with several fraternal organizations, belonging to the Modern Woodmen at Bluffton, to the Maccabees at Mt. Cory, and to the Royal Arcanum at Findlay.

PETER J. SMITH, township trustee in Van Buren Township, Hancock County, O., where he is a prominent farmer, owning eighty acres of excellent land, situated in Section 22, was born in this township, February 9, 1857. His parents were Peter and Christina (Hickler) Smith.

Peter Smith was born in Germany and was about seven years old when his parents brought him to America. They settled in Madison Township, Hancock County, and there Peter Smith grew to manhood and later married Christina Hickler, a daughter of Andrew Hickler, of Van Buren Township. Thirteen children were born to this marriage and eleven of these still survive. Both parents lived into honored old age, the father dying when almost eighty years old and the mother in her seventy-third year and their burial was in the German Lutheran Cemetery, southeast of Jenera. They were good, Christian people, devoted members of the Lutheran church. The father cast his vote with the Democratic party.

Peter J. Smith, with his brothers and sisters, attended the district schools and he was twenty years old when he spent his last winter in the school room. He helped his father on the home farm for four years more and then married and for two years afterward lived in Madison Township and then moved on a farm situated just east of his present one. After selling that place he purchased his present farm in Section 22. He has made many improvements here and all the buildings now standing have been remodeled. He carries on general farming and stock raising. Mr. Smith is one of the representative men of this section and in no way can his reliability be better shown than by the fact that he is serving in his fourth year as township trustee. He enjoys the entire confidence of his fellow citizens. In politics he is a Democrat.

In 1881, Mr. Smith was married to Miss Mary Piper, a daughter of Adam Piper, of Madison Township, and they have had four children: Henry, who married Minnie Traucht; Charles, who married Amy Piper, a daughter of Adam Piper; George, who married Dora Bame, a daughter of David Bame, of Madison Township; and Emma, who died when three years old. Mr. Smith and family are members of the Lutheran church at Jenera.

GEORGE W. KEERAN, a representative citizen and prominent farmer of Pleasant Township, Hancock County, O., who owns eighty acres of well improved land located one-half mile north of McComb, was born in Sandusky County, O., in 1853, and is a son of Nathaniel and Eliza (Linch) Keeran.

The parents of Mr. Keeran came to Hancock County and settled in Portage Township about two miles east and two miles north of McComb, about 1863. Previously the father had followed the blacksmith trade but after coming to this section engaged in farming and died on his own land in Portage Township, in 1879. His parents were of Scotch-Irish ancestry and came from the north of Ireland to Sandusky County, O., where he was born. Nathaniel Keeran married Eliza Linch, who died in 1886. They had twelve children born to them: William, Cornelius, Nancy, John, Mary Ann, Malinda, Esther, Reuben, George W., Eli, Adaline, and one that died an infant. William was a farmer and at the time of his death, in 1909, he lived in Illinois. Cornelius, who spent some years in Kansas, returned to Ohio before his death, which took place at Belmore, in Putnam County. Nancy was the wife of Lawrence Brown and they both died at Toledo. John was killed when serving as a soldier in the War of the Rebellion, at the battle of Antietam. Mary Ann is the wife of Frank Brown. Malinda is the widow of John Buchanan and resides in Wood County, O. Esther, who died in August, 1910, was the wife of William P. Routson, of Portage Township. Reuben is a prominent physician at Findlay. Eli is a farmer in Putnam County. Adaline is the wife of J. J. Routson and they live in Michigan. The father and mother of the above family were members of the Baptist church. In politics the father was a Republican.

George W. Keeran obtained a district school education and worked on the home farm for his father until he was twenty-one years of age and after that time was employed by his father for some years. Farming has been his main business and he has engaged in it at several points, spending six years west of Deweyville and for twenty years before settling on his farm in Pleasant Township, he lived in Henry County, where he owned 120 acres of land. After selling that place, in the spring of 1908, he purchased what was known both as the Griffin farm and the Wall farm. Mr. Keeran has made many improvements here, including the building of a fine modern residence and a substantial hip-roof barn. His farm industries are all in fine shape, all of his land with the exception of eight acres being now under cultivation. He may be numbered with the comfortably independent men of the township but his prosperity has been brought about through his own efforts. When he decided to purchase his first farm he borrowed the money for his first payment from his kind mother. Misfortune pursued him apparently at first, as he lost seventy-five head of fat hogs from cholera and later lost his barn in Henry County, from fire. In spite of many discouragements, however, Mr. Keeran kept up his courage and where he had worked hard before, worked still a little harder and applied himself a little closer and the time came when he no longer owed a dollar and, on the other hand, had lands and herds which made him a man of ample means. In politics he is a Republican.

Mr. Keeran married Miss Mary Yantis, a daughter of George Yantis of Pleasant Township. They are members of the Methodist Episcopal church.

C. F. JACKSON COMPANY, proprietors and founders of one of the largest business enterprises of Hancock County, O., conduct an immense department store at Findlay which is locally known as the Glass Block. The president of this company is C. F. Jackson, while the general manager is his son, Edward E. Jackson, both of whom are men of large business experience and unquestioned integrity.

Before investing in property at Findlay, the members of the above firm visited the place and carefully considered its possibilities as became astute men of business and after deciding that the field was a promising one in which to establish their proposed great store, they soon secured an excellent location. They purchased the old hotel building formerly known as the Joy House, on the corner of Main and W. Sandusky Streets, and after completely remodeling the same and installing modern conveniences and appliances, opened for business in 1905. This store inaugurated an entirely new scale of merchandising at Findlay. Prior to this no merchant had ever had the courage to gather together so complete and valuable a stock under one roof, or had the enterprise to put forth the efforts which have made the Glass Block, at Findlay, a complete success, so great a one that in the year following its beginning a business of over a half million dollars was transacted. The different departments, some twenty in number, include those devoted to meats, groceries, notions, ladies' and gentlemen's furnishings, shoes, clothing, furniture, millinery, carpets musical instruments, in fact here may be found almost every object, utensil, commodity or convenience that establishments of this kind in metropolitan cities offer. The company maintains a very large force, more than 105 names being on the pay roll, these including salesmen, salesladies, window trimmers, bookkeepers, managers and others in more humble capacities, all being necessary to the smooth running of so large a business. The company occupies the entire building at Nos. 500-508 Main Street, which is three stories high, together with a portion that reaches up another story. The company has provided also for the enjoyment of their patrons by establishing aesthetic surroundings, few mercantile houses in this part of the state having what may be termed a foyer with comfortable seats surrounding a playing fountain as may be seen in the Glass Block. In addition to other goods of modern design and up-to-date ideas, the company has one department devoted to the display and sale of automobiles, their garage being located on Park Place, near the Court House. Here may be seen cars of every price and description that have been favorably received by the public, together with automobile tires and sundries. To successfully manage a stupendous business like this requires much more than the usual amount of ability and the members of the firm of C. F. Jackson Company are thus accredited.

C. F. Jackson, the president of the C. F. Jackson Company, was born and reared at Norwalk, O. He obtained his education and entered into business there, in the course of time becoming a member of the firm of Marsh & Jackson. Later he sold his interest in that firm and moved to Minneapolis, where he was engaged in business for ten years, when he returned to Ohio and subsequently opened the

Glass Block department store which the company still conducts, at Norwalk, O., where Mr. C. F. Jackson resides. This was in 1894.

Edward E. Jackson, general manager of the C. F. Jackson Company, was born at Norwalk, O., but spent ten years of his school period at Minneapolis. As soon as sufficiently matured he was taught business precepts in his father's store and continued in the Glass Block at Norwalk until 1905, when he came to Findlay to be general manager of the new store. He is recognized as one of the progressive and wide awake young business men of the city and has made friends both of a business and a personal nature.

Mr. Jackson was married at Findlay to Miss Glenna Weil, a daughter of John Weil, who is in the drug business at Findlay, and they have one child, Mary. He is identified with the Elks.

SAMUEL SWAB, justice of the peace, is one of Cass Township's most valued and substantial citizens, one of the heaviest taxpayers and public spirited men, and owns four fine farms, comprising 637 acres, and resides on one containing 140 acres. He was born in the old log house standing on his father's farm at that time, in Westmoreland County, Pa., August 5, 1845, and is a son of George and Mary (Rodibaugh) Swab.

George Swab was born in 1813, in Westmoreland County, Pa., and his father's name was also George and he was born near Philadelphia, his parents having come from Germany. Six children were born to the older George Swab: George, Solomon, Samuel, Christiana S., Smith, Mary, and Barbara Duffield, all deceased. George Swab (2) grew to manhood in Westmoreland County, and for a time operated a distillery there. He married Mary Rodibaugh, who died in Pennsylvania when their son Samuel was three years old. Six years later Samuel Swab accompanied his father and his brother and sister to Hancock County. The father settled in Cass Township, buying eighty acres of timbered land, the only improvement being a log house. He cleared and improved this place and put up the greater number of the buildings and continued to live here until the close of his life. His death occurred August 20, 1907, he being at that time the oldest man in the township. His second marriage was to Fannie Shaufler, who was born in Fairfield County and still resides in Cass Township.

Samuel Swab was the eldest born of his father's three children. His brother, David Swab, lives in Allen Township. His sister, Barbara, who is now deceased, was the wife of Andrew Pletcher, of Allen Township. Mr. Swab obtained a district school education. He gave great assistance to his father in clearing the homestead and has always been a hard working man. Although Mr. Swab owns much more land than does the average farmer, he has earned every acre of it by his own industry with the exception of the forty acres given him by his father. He has always been a progressive and enterprising man and has set a good example in his township in clearing and developing his property, in which he has spared neither time, labor nor expense. Oil is produced on all the farms.

On September 25, 1872, Mr. Swab was married to Miss Barbara Kagy, a native of Fairfield County and a daughter of Samuel and Hannah Kagy, who came to Hancock County when Mrs. Swab was an infant. Four children have been born to Mr. and Mrs. Swab: Blanche, who is the wife of John A. Nusser, of Allen Township, and they have one child, Dorothy; Delora, who is the wife of Charles Harry, of Allen Township; Samuel K., who assists Mr. Swab on the home farm, married Bessie Ullery and they have two children—Gladys and Bernice; and Pearl, who is the wife of S. J. Overholt, of Cass Township, and they have two children—Frances and an infant.

Mr. Swab and son are Republicans and he has served in responsible township offices, having been president of the school board and township treasurer and trustee. Samuel K. is also prominent in township affairs, serving as school director and at present is constable. The family is a representative one in Cass Township, Hancock County.

LEWIS F. BRICKMAN, county commissioner of Hancock County, O., and a well known general farmer and cattle raiser of Pleasant Township, was born March 31, 1858, on the old Taylor farm in Washington Township, Hancock County, O., a son of William and Aaronstina (Geisler) Brickman. William Brickman was born in Germany and died in Portage Township, Hancock County, O., where he was engaged in agricultural pursuits. The mother of our subject died in McComb.

Lewis F. Brickman grew to manhood in Hancock County, and attended the schools of his home district. He was reared a farmer and his first farm was a tract of twenty acres, which he bought in Pleasant Township in 1883. Mr. Brickman is now the owner of several farms, having 219 acres in Pleasant Township, 240 acres in three tracts in Blanchard Township, and 103 acres in Allen Township, all in Hancock County. Mr. Brickman carries on general farming and is extensively engaged in raising cattle, hogs, sheep, horses, etc.

Mr. Brickman is a Democrat politically, and in the fall of 1908 was elected a member of the Board of County Commissioners, assuming the duties of that office September 20, 1909. He served six years and nine months as trustee of Pleasant Township and was for twenty-seven years a member of the school board, but resigned from office in the spring of 1910. He is a director of the McComb Banking Company of McComb. His religious connection is with the Lutheran church of McComb, of which he is one of the directors, and served as an elder many years, and for eight consecutive years was treasurer of same.

Mr. Brickman was married in 1883 to Amanda J. Fundum, who is a daughter of Henry Fundum of Blanchard Township, and to them have been born the following children: Henry, who married Inez Donaldson, who died leaving two children, Robert and Arthur; Samuel; Clara, who is the wife of Charles Roy, has one child, Dorothy; and William.

JAMES SYLVESTER CUSAC, who owns 108 acres of valuable farm land, situated in Section 31, Portage Township, Hancock County, O., has lived here since 1889 and was born on an adjoining farm, September 1, 1852. He is a son of John and Nancy (Bell) Cusac, the former of whom died on this farm in the spring of 1904, aged eighty-three years. The latter still survives and is now in her eighty-eighth year.

James S. Cusac was reared in Portage Township and has always lived here with the exception of six years spent in Liberty Township. He attended the country schools and has made farming and stock raising his main interests, and as he is practical and progressive he has met with very satisfactory results.

Mr. Cusac married Miss Margaret Litzenberg, who was born at Findlay, O., and died on this farm in the fall of 1904. Her father was John Litzenberg. Mr. and Mrs. Cusac had three children: Robert, who married Oral Pennelton, has one child; May, who married Leroy Nutter, of Colorado, has one child; and Loren, who remains at home with his father. Mr. Cusac is a member of the Blanchard Presbyterian Church.

JAMES A. McCALL. One of the important business concerns at Findlay, Ohio, is that of Tarbox & McCall, who are owners of stone quarries, and manufacturers and dealers in crushed stone and stone and concrete blocks—a business which was established here in the fall of 1897—also manufacturing cement drain tile. The firm consists of Harry L. Tarbox and James A. McCall. Their works and quarries are situated on Western Avenue, their offices being at No. 953 Western Avenue. Employment is given to about twenty-five men, while the output has a wide field of distribution.

James A. McCall was born on a farm in Greene County, Ohio, May 16, 1864, and is a son of John G. and Eliza (Junkin) McCall. They still reside on their farm, the same one on which their son was reared and resided until he came to Findlay in 1897. James A. McCall was married to Miss Lulu Park of Belle Center, Logan County, Ohio, and they have two sons, Wallace A. and Ernest W.

Harry L. Tarbox, the senior member of the firm of Tarbox & McCall, was also born in Greene County but he came to Findlay several years prior to the advent of his partner. They are both men of enterprise and are enjoying a prosperous business with a promising future. They are recognized as valuable additions to Findlay's good citizenship.

LEONARD B. DECKER, who owns the old homestead farm in Section 26, Allen Township, Hancock County, O., was born here, November 21, 1869, and is a son of James and Mary (Barnd) Decker.

James Decker was born in Crawford County, O., January 16, 1837, a son of Mahlon and Minerva (Dull) Decker, the former of whom was born in New Jersey and the latter in Pennsylvania. They married in Pennsylvania and shortly afterward came to Crawford County, O., and in 1845 to Hancock County. Here Mahlon Decker bought eighty acres of timber land in Section 24, Allen Township, on which he erected a log cabin in which they lived for twenty-five years. Mahlon Decker died in July, 1874. His widow survived until almost ninety years of age.

James Decker was eight years old when his parents brought him to Hancock County. In 1860 he purchased his first piece of land, a tract of forty-six acres, to which he added at various times. In August, 1862, he enlisted as a private in Co. G, 118th O. Vol. Inf., for service in the Civil War then in progress, and he participated in a score of battles in the Middle West. He was severely wounded at the battle of Resaca, from the effects of which he became incapacitated as a soldier and was honorably discharged in 1865, a short time before the war closed. He lived many years afterward, however, his death occurring December 12, 1904. He was a member of Stoker Post, G. A. R., Findlay. He married Mary Barnd, a daughter of John and Sarah Barnd, early set-

JAMES A. McCALL

tlers in Hancock County. Mrs. Decker was born in Allen Township, in 1838, and still survives, her home being at Defiance, O. Eight children were born to James and Mary Decker.

Leonard B. Decker has passed the greater part of his life on this farm, in fact all but nine years of it. During a part of that time he worked at Findlay as a carpenter and spent the remainder as a laborer in the oil fields. He acquired oil interests, his father being treasurer of the Hancock Oil and Gas Company, this being the first organization to open the fields north of Findlay. Mr. Decker rents out the farm for agricultural purposes, and to the Ohio Oil Company, which has twelve wells on the place beside the three producing wells owned by Mr. Decker.

Mr. Decker was married to Miss Rose Horner, a daughter of Jacob Horner, and they have two children: Stella and Edna. Mr. Decker is not particularly active in politics, but he is interested in the fraternal order of Knights of Pythias and belongs to Lodge No. 85, at Findlay.

BENJAMIN BOWERSOX, owner of forty acres of fine farm land situated in Section 18, Union Township, Hancock County, O., has resided on this place for the past seventeen years and is one of the representative citizens of Union Township. He was born in Snyder County, Pa., June 26, 1857, and is a son of Daniel and Amelia (Steimley) Bowersox, also natives of Pennsylvania. They came to Hancock County, O., in 1860 and settled in Eagle Township, where the father followed farming all his life. His death occurred five years later but his widow survived until 1887.

Benjamin Bowersox was reared and educated in Union Township. His business has always been of an agricultural nature and he is counted among the successful farmers and stock raisers of this section. His farm is well situated, lying about four miles northwest of Mt. Cory, on the Ridge road.

Mr. Bowersox was married first to Miss Christina Steiner, in 1891. She was a school teacher who had taught four terms in Putnam County, where she was born. She died in Hancock County in 1901, aged forty-six years, leaving no issue. In 1901, Mr. Bowersox was married second to Miss Jennie Forsythe, who was born at Kenton, O., a daughter of a well known teacher there. No children have been born to the second marriage. Mr. Bowersox is a member of the Church of God, at Pleasant Ridge, in which he has served as a deacon and a member of the board of trustees.

FRANKLIN COOKSON, who is engaged in agricultural pursuits on a tract of ninety acres in Orange Township, Hancock County, O., was born December 25, 1848, in Trumbull County, O., and is one of the representative citizens of the community in which he lives. He attended the common schools of Orange Township, until twenty years of age, when he engaged in farming, and has made that his life occupation. He now has one of the best improved farms in the township, although at the time he purchased the place it consisted wholly of timberland.

Mr. Cookson was united in marriage with Miss Henrietta Thuston, who is a daughter of Henry and Eva Thuston of Orange Township, and to them have been born the following children: Hulda Alura, who died at the age of nineteen years, six months and twenty days, was buried at Hasson Cemetery; Alva V., who married Bertha Whitbeck of Orange Township, and they have two children—Charles F. and Mary Etta; and William Henry, and Clarence Calvin.

Mr. Cookson is politically identified with the Democratic party but has never held any offices. He belongs to the Evangelical church, in which he is a steward and a member of the board of trustees. Fraternally he is identified with the Masonic order at Bluffton, O.

GEORGE K. CHAMPION, a prominent citizen of Pleasant Township and one of the substantial agriculturists of this section of Hancock County, O., owns 227 acres of valuable land which is devoted to general farming. He was born in Pleasant Township, October 23, 1848, and is a son of William J. and Susan (Wiseman) Champion.

William J. Champion was a son of William J. Champion and was born near Fostoria, O., from whence he came to Hancock County in 1847. He settled in Pleasant Township, five miles west of McComb and one mile north of Shawtown and died on that farm in 1869, at the early age of thirty-eight years. When he came to this section it was almost all in woods and a large part was under water from lack of drainage. The forest stretched at that time from the tract purchased by Mr. Champion all the way to Fostoria and his widow recalls the fact that they stopped over night at Findlay while journeying to the new home. At that time Findlay was a village, but was the height of civilization compared to the forest in which these brave pioneers started the building of their home. Mr. Champion's life was probably shortened by the great strain he put upon his strength and vitality in clearing and draining this land and endeavoring to make improvements. He built a frame house and had prepared the timbers for a substantial barn when he was prostrated and his death followed. In early manhood he had married Susan Wiseman, also born near Fostoria, a daughter of James Wiseman. Mrs. Champion has reached her seventy-seventh year. Her home is with her son, George K. To William J. Champion and wife the following children were born: Mary E., who is the wife of Lewis J. Hardin, of Pleasant Township; George K.; William, who is a farmer residing near Coldwater, Mich., married Rosanna Kelley, of Hancock County; Nancy, deceased, who was the wife of Edward Miller, of Wood County; and John, who is in the employ of the Downey & Harris Tile Manufacturing Company at Findlay, married Cora Miller. The father of the above family served three years in an artillery regiment in the Civil War, and suffered an injury from which he never recovered. In politics he was a Democrat.

When his father entered the army, George K. Champion, as the eldest son, had many responsibilities placed on him and his school period closed early. He has devoted himself to agricultural pursuits in the main and carries on his operations in a scientific manner, being a firm believer in the value of rotation of crops. His farm of 227 acres has been his possession since 1889. It was formerly known as the old Daniel Spaulding farm and was purchased by Mr. Champion from Obed Neible. He has done a large amount of general improving and erected the present comfortable residence.

In 1883, Mr. Champion was married to Miss Rachel Nevada Cummings, a daughter of George F. and Mary (Hull) Cummings and a grand-daughter of Benjamin Cummings, an early settler and one of the first men to fill the office of justice of the peace at McComb. The father of Mrs. Champion was a soldier in the Civil War and both he and wife are deceased. Mrs. Champion was an only child. To Mr. and Mrs. Champion three daughters were born, namely: Estella, who married Earl Smith, of Pleasant Township and they have one daughter, Dorothy; Ethleen, who is the wife of Burrell Auckerman, a farmer in Pleasant Township; and Vivian, who resides at home. Mr. Champion and all of his family are members of the Church of God at Deweyville. In politics he is a Democrat and is active in party matters in the county although he has seldom consented to accept political honors for himself. He has served, however, for some years as a member of the board of elections and is president of this body.

RICHARD J. GOHLKE, superintendent of the Maple Grove Cemetery, at Findlay, O., was born in Germany, December 23, 1862, and is a son of Ferdinand Gohlke and his wife, Henrietta Gohlke. The father died in Germany in February, 1872, but the mother still lives. She is in her eighty-eighth year and is cared for by her son, Richard J., and is a resident of his household.

Richard J. Gohlke learned the florist and gardener business in his native land and became so expert that he was employed in the Emperor's gardens in the city of Berlin. According to the German law he served his allotted term in the army and held the rank of corporal. Afterward he continued to work as a florist and in 1891 he decided to come to America, where his older brother, William Gohlke, was in the railroad business, being section foreman on the T. & O. C. Railroad, at Findlay. After joining this brother he worked under him for one year but kept on the lookout for work at his own trade and in 1892 found it and on May 1, of that year, became an employe of the Maple Grove Cemetery, a tract of forty-two acres of land. On May 1, 1899, Mr. Gohlke became superintendent, succeeding William Taylor, and here, with his force of twelve men, Mr. Gohlke has made this indeed a beautiful spot. He understands landscape gardening and also the treatment of trees, vines, shrubbery and plants and the different composition of soil in which each one will best develop and has the natural taste to teach him how to make all into an attractive whole. He spares no pains to make this place a credit.

Mr. Gohlke was married in Germany in 1885, to Miss Albertina Schwartz, and they have five children: Richard, who works with his father in the cemetery, is married and lives at Findlay; Paul, who lives in California; William, who is a mail carrier; and Freda and Johanna, at home. Mr. Gohlke is a member of the order of Odd Fellows.

ROBERT BOWERSOX, who owns seventy-eight acres of well improved land in Section 16, Union Township, Hancock County, O., lying two miles north of Mt.

Cory, is one of the representative men and successful farmers and stock raisers of this township, of which he has been a resident for fifty years. He was born in Snyder County, Pa., January 3, 1858, and is a son of Jacob and Mary (Keyster) Bowersox.

Jacob Bowersox was born in Pennsylvania, where he married, and with his wife came to Hancock County, settling in Union Township when their son Robert was an infant. He continued to live in Union Township and carry on farming and here his death occurred in 1890. His widow, now eighty-seven years of age, lives on the old homestead east of Rawson, O.

Robert Bowersox attended the public schools in Union Township and has devoted himself to farm pursuits. His land is valuable and he has it well tiled and carefully cultivated. He carries on a general farming line which includes the growing of grain and the raising of good stock of all kinds. His buildings are substantial in construction and are sufficient for all the needs of the farm.

In 1873, Mr. Bowersox was married to Miss Nevada Powell, a daughter of Henry and Susan Powell, of Hancock County. Three children have been born to Mr. and Mrs. Bowersox, namely: Iva, who married Charles Bubring, also of Hancock County, and they have one son, Harold; and Raymond and Earl, both of whom assist their father. Mr. Bowersox is a Republican and in the fall of 1909 was elected assessor of Union Township for a period of two years. From 1906 until 1908 he served as a justice of the peace. For twenty years Mr. Bowersox has been a member of the Allbright Methodist church at Mt. Cory.

BENJAMIN F. FRY, residing on a fine farm of 240 acres in Section 18, Liberty Township, is one of the progressive and substantial farmers of Hancock County, O., and was born April 5, 1854, in Liberty Township, a son of Henry and Susanna (Spangler) Fry.

Henry Fry was born in Germany, in 1805, and when a lad of nine years stole his passage to the United States, landing in Baltimore, Md., after a voyage of four or five weeks, with but six dollars in cash. He remained one month in Baltimore, and after spending five dollars of his capital, worked by the day at a wage of twenty-five cents. He then went to Fairfield County, O., where he entered the employ of a Mr. Bazel, for whom he later spent some eight years as manager of the farm and as wool buyer. In 1848 he came to Hancock County and purchased a tract of forty acres in Liberty Township, and subsequently became the owner of over 600 acres of valuable farm land in Wood and Hancock Counties, the greater part lying in the latter county. During his early days he also dealt in cattle, and about the time of his marriage drove a large number to Pittsburg, taking several months to make the trip. After coming to Liberty Township, he built a log road, about twenty inches thick, from the center of Section 18 to a little beyond the center of Section 19, and resided along that road the remainder of his life. His marriage with Susanna Spangler resulted in the birth of eight sons and five daughters, all living but one son and two daughters. His wife lived to the age of seventy-eight years, and he to the age of eighty-six years and eleven months, dying in August, 1892. Both are buried in the Aurand Cemetery of Liberty Township. Henry Fry and his wife attended the Church of God. Politically he was a strong Republican.

residing on a fine
1 18, Liberty Town-
sive and substantial
y, O., and was born
Township, a son of
gler) Fry.
Germany, in 180
rs stole his passage
g in Baltimore, Md.,
ive weeks, with but
emained one month
ding five dollars of
day at a wage of
n went to Fairfield
ed the employ of a
er spent some eight
farm and as wood
o Hancock County
rty acres in Liberty
y became the owner
able farm land in
ies, the greater part
During his early
and about the time
ge number to Pitts-
s to make the trip
ownship, he built a
hes thick, from the
ttle beyond the cen-
led along that road
His marriage with
in the birth of eight
l living but one son
ife lived to the age
d he to the age of
n months, dying in
rried in the Auran
nship. Henry Fry
hurch of God. Po-
publican.

DON C. HUGHES, M. D.

Benjamin F. Fry received his education in the schools of Liberty Township, and after completing same, devoted his time to agricultural pursuits on his father's farm. After his marriage he lived in the old homestead for two years, then built his present residence in which he has lived continuously since. Besides his farm of 240 acres, Mr. Fry also owns four fine residences in Findlay, O.

Mr. Fry was united in marriage with Miss Laura Grose, who is a daughter of Jacob Grose, of Findlay, and they have three children: Myrtle, who is the wife of Roy Schoonover of McComb, O.; Ray; and Glenn. Mr. Fry is politically identified with the Republican party, and has been a member of the Liberty Township School Board for two years. The family attends the Union Christian church.

HARRY J. MOREHART, assistant cashier of the Vanlue Banking Company, at Vanlue, Hancock County, O., belongs to a substantial old family of this section. He was born in Amanda Township, Hancock County, O., November 22, 1876, and is a son of Jesse D. and Elizabeth (Beck) Morehart.

Jesse D. Morehart was also born in Amanda Township, a son of David Morehart, who entered 160 acres of land in Amanda Township at an early day. This property came to his sons: David, John, S. F. and Jesse D. The last named married Elizabeth Beck, who was born and reared in Amanda Township. They still reside there and have had four children: Ray; Delle F., who married A. L. Woodyard, of Delaware Township; Ross V., who died at the age of fifteen years; and Harry J.

Harry J. Morehart was educated in the public schools of Amanda Township and at Vanlue, after which he engaged in farming until he accepted the position of assistant cashier of the Vanlue Banking Company, on May 1, 1909. He has a wide acquaintance in the agricultural districts and enjoys the confidence of the whole business community.

In 1909, Mr. Morehart was married to Miss Cora Deidrich, who was born and reared in Wyandot County, O. They have one son, Ralph J. Mr. and Mrs. Morehart are members of the United Brethren church. He is identified fraternally with the Odd Fellows at Vanlue and the Knights of Pythias at Findlay.

DON C. HUGHES, M. D., who has been in the active practice of medicine and surgery at Findlay, O., since September, 1894, is numbered with the leading medical men of his city and is in the enjoyment of a very satisfactory business. Dr. Hughes was born at Findlay, February 17, 1871, and is a son of Leonidas H. and Eva (Swapp) Hughes.

The Hughes family is an old Pennsylvania one and from that state went Great-grandfather William Hughes into the Patriot Army in Revolutionary days. The father of Dr. Hughes was born in the old home where his father had lived and died, and remained there until 1858, when he came to Hancock County, O. In 1861 he enlisted for service in the Civil War, entering Co. E, 59th O. Vol. Inf. On the dreadful field of Chickamauga, he was so seriously wounded that he was obliged to return home permanently. He settled at Findlay, and later he filled public offices.

Don C. Hughes is an only child and he was carefully reared and was given school advantages at Findlay, where he graduated from the High School in 1889. Prior to entering upon the study of medicine, he devoted more than a year to civil engineering, an accident at that time changing the current of his life. Undoubtedly Dr. Hughes would have become a competent civil engineer for he possesses the carefulness and accuracy which that profession would have demanded and which are equally necessary in the one in which he has reached a high degree of success. His preliminary study was done with Dr. F. W. Firmin, and in 1893 he was graduated from the College of Physicians and Surgeons, at Baltimore, Md. For eighteen months Dr. Hughes practiced in Chicago, during this time being one of the physicians to the World's Fair Hospital Corps, and while there visited many times the great clinics in that city. His whole period of medical practice with this exception has been at Findlay. Here his interests have been centered more or less all his life, and here, together with friends made in recent years, are those who have watched his career with interest, since his boyhood.

Shortly after his graduation from medical college, Dr. Hughes was married to Miss Maude Gleason, of Chicago, now deceased. He was recently married to Laura, daughter of Mr. and Mrs. Vallorous Brown, of Columbia City, her father being one of the wealthy and influential citizens of Indiana. Dr. Hughes has erected a handsome residence on North Main Street, with all modern conveniences. He is identified with the leading medical organizations, including the Hancock Medical Society, of which he is now president; the Ohio State Medical Society; the Northwestern Ohio Medical Society, of which he is vice president: and the American Medical Association, and is surgeon of the 5th Reg. O. N. G., with headquarters at Cleveland. Dr. Hughes is now, and has been for the last seven years, head medical examiner for Ohio, of the Modern Woodmen of America, the largest insurance fraternal organization in the world. In politics he is a strong Republican.

AARON J. GLATHART, a former well remembered citizen of Findlay, O., a veteran of the Civil War and a member of a prominent pioneer family, was born in Hancock County, O., February 14, 1844, and died at Findlay, January 8, 1909.

The father of Aaron J. Glathart was born in Switzerland, in 1802, and lived there until 1828, when he came to Hancock County, and settled on a farm in Big Lick Township. He was a stonemason by trade and was one of the men who helped build the old Erie Canal.

Aaron J. Glathart was reared on the home farm and when fifteen years old went to Lawrence, Kans., where his older brother, J. H. Glathart, was operating a bakery and provision store. In 1859, the younger brother was taken into partnership but in the early part of 1860 the business was sold and Aaron J. returned to Hancock County and in the same year his father died. In the following year Civil War was precipitated and in August, 1861, Mr. Glathart enlisted in a company organized at Findlay, O. He was one of four Glathart brothers and was the only one to escape a violent death. Rudolph H., was killed by guerrillas of the Confederate force, on Brazos River, Tex., in May, 1865. Manassa G., who was a scout under General Lyon, was killed at Wilson's Creek, Mo., August 10, 1861. Leon L., who was a private in Co. C. 49th O. Vol. Inf. died of smallpox at Chattanooga, Tenn., February 29, 1864.

Aaron J. Glathart enlisted in Co. H, 57th O. Vol. Inf., 1st Brigade, 15th Army Corps, Army of the Tennessee, and perhaps he saw as much hard army service as any other man that went out from Hancock County. He was on many battlefields and participated in the struggles that took place between the contending forces at the following points: Fort Donelson; Shiloh; Siege of Corinth; Morning Sun, Tenn.; Wolf Creek Bridge; Tallahatchie; Holly Springs, Miss.; Chickasaw Bayou; Yazoo Pass, Miss.; Arkansas Post, Ark.; second expedition to Chickasaw Bayou; Steele's Bayou; Deer Creek, Miss.; running the batteries at Vicksburg, on the ram "Queen of the West" on April 16, 1863; Raymond, Miss.; Jackson, Miss.; first and second battles at Champion Hills; Big Black River, Miss., May 17, 1863; Siege of Vicksburg, May 18-July 4; Chattanooga; Missionary Ridge; Knoxville, Tenn.; Snake Creek Gap; Dalton; Resaca; Kingston; New Hope church; Big Shanty; Kenesaw Mountain; Pumpkin Vine Creek and Atlanta, Ga. During all this long and dangerous service he was a brave and ready soldier but it was not ordained that he should escape all the most serious trials of warfare. On July 19, 1864, the Army of the Tennessee swung around Atlanta and on July 22, just after the tragic death of the brave General McPherson, Mr. Glathart was made a prisoner. He was despatched with others to Andersonville, Ga., the mention of the horrors of which still blanches many a cheek, and there he was held from July 25, 1864, until October 1, 1864, when he was sent to Savannah and was held there for two weeks. From there he was sent on to Milan, Ga., and kept in a stockade there until December 1, 1864, then passed on to Charleston, S. C., where, with other unfortunates, he was placed under the fire of the Federal batteries. About four days he was kept in that position and then was turned over to the authorities at Florence, S. C., where a new stockade had been built. In the latter part of December, 1864, he was finally paroled and sent to a hospital at Annapolis, where he was given a parole and returned home. At this time he seemed completely wrecked in health and for seven months afterward was unable to speak aloud. A splendid constitution, however, and home care restored him sufficiently to attend the Grand Review at Washington, D. C., although he went against the protests of friends and physicians, and through excitement was stimulated enough to proudly take his old place as color bearer in his regiment, a position he had held for the last fourteen months of his service.

During the last charge on Vicksburg, July 4, 1863, Mr. Glathart was severely wounded in the abdomen, a ball piercing the twenty-seven thicknesses of his rubber blanket and a heavy brass belt plate. He was placed in a field hospital, but, in spite of his injury, managed to escape from his guards the same night and made a desperate march until he rejoined his regiment, being determined to not be left behind. The full history of these heroes of the great struggle will never be adequately told. His wound would not heal, however, and later it became so aggravated that he could neither carry his musket nor wear a belt, therefore he was detailed to light duty about camp and was made postmaster and was serving in that capacity as well as color bearer when he was honorably discharged and mustered out at Little Rock, Arkansas, August 25, 1865.

Broken in health, Mr. Glathart returned to Findlay, but soon afterward went to Kansas and sought to regain his health by open air treatment, camping out on the prairies for three months. He became well pleased with

Douglas County and entered into the auctioneering business and in the following year bought a farm near Lawrence, on which he remained until 1874, when he returned to Hancock County. He still continued to reside on a farm up to 1897, when he came to Findlay and in this city he passed away January 8, 1909, aged sixty-five years. He was interested in the Grand Army of the Republic and was a member of Stokes Post, No. 54.

Mr. Glathart was married to Miss Amanda J. Strother, who was born in Hancock County, O., and was a daughter of Anthony W. and Mary Strother. Her uncle, Robert Strother, was a soldier in the Revolutionary War from Virginia. To this marriage seven children were born, as follows: Lena, who married Capt. T. L. Huston, of the U. S Engineer Corps; Harry A., who is city engineer of Findlay, O.; Floy M., who married Levi K. Harvitt; Edna E., who was the wife of Harvey Warren, died August 25, 1897; Roland L., who was a member of Co. A, 2nd Ohio Infantry in the Spanish-American War; Gail G., who married Harry Riemund, and Carl A., who enlisted in the U. S. Navy, June 6, 1900.

JOHN BAKER, whose 240 acres of valuable land all lies in Cass Township, Hancock County, O., 160 acres being in Section 26, and eighty acres in Section 27, farther west, is one of the substantial and representative men of this part of the county. He was born on this farm, January 5, 1847, and is a son of Alexander and a grandson of Grafton Baker.

Alexander Baker was born in Carroll County, O., and was a young man when he came to Hancock County. His father was Grafton Baker who was probably a native of England but moved from Maryland to Virginia and from there to Carroll County, O. When he came to Hancock County he entered 200 acres of land in Washington Township and a three-quarter section in Cass Township, and his son John has the old deed for this land, bearing the signature of Andrew Jackson as President of the United States. Grafton Baker died on the Washington Township land, leaving his property to his children. He had four sons—Elisha, James, Alexander and Garrett, and one daughter, Nancy, who was the wife of John Ebersole. In the division of the property, Elisha, Alexander and James took the Cass Township land, while Garrett kept the old homestead in Washington Township. Each one cleared up his own land, and erected cabins in the woods, but Alexander was better off as his father had built a frame house. All have taken pride in keeping this land in the Baker name.

Alexander Baker married Catherine Eckert, who was born in Fairfield County, O., and had accompanied her parents to Hancock County. After marriage Alexander Baker and wife settled on the 160-acre farm, on which John Baker lives, although at that time it was covered by the forest. Later he improved his residence and partly cleared the farm. He died in 1849, aged thirty-seven years, but his widow survived until 1909, dying in her eighty-fourth year. They had the following children: Lucinda, deceased; John; and Amanda, who is the wife of G. W. Norris.

John Baker had but meager school opportunities as his father died when he was young, but he remembers the old log school house. Being the only son he was forced to take charge of the farm before he had reached man's estate, but success has always attended his well directed efforts. He no longer cultivates his land, renting it out, and he enjoys a considerable income from oil wells on the property. The substantial buildings on his home place he put up and has done a large amount of improving in one way or another. Mr. Baker has additional interests, being vice-president and one of the directors of the Arcadia Bank and Savings Company, at Arcadia, O.

On January 16, 1868, Mr. Baker was married to Miss Sarah Binger, who died in 1887. Mr. Baker has three children: Alexander, Lemuel and Amanda. Alexander lives on a part of his father's land. He married Marion Taylor and they have three children: Earl, Helen and Garnett. Lemuel married Mary Belle Dorsey and they have four children: Lois, Harry, John and Frances. Mr. Baker is a Republican in politics, and at times he has served in public office, having been township trustee and for twenty-four years has been a justice of the peace.

SAMUEL EDGAR MOOREHEAD, president of the Portage Township School Board and a leading citizen of this section, owns 125 acres of valuable land, all in one body, although thirty-three and one-half acres lie in Henry Township, Wood County, O. The Portage Township land is situated in Section 4, on the Sand Ridge road and the Wood and Hancock County line runs through the farm. Mr. Moorehead was born on his father's farm in Portage Township, May 4, 1860, and is a son of John E. and Catherine (Morris) Moorehead.

John E. Moorehead was born in Stark County, O., and was a son of Samuel Moorehead who came to Hancock County when the former was ten years old. Samuel Moorehead was a native of Pennsylvania. In 1834 he entered the land now owned and resided on by his grandson, Samuel E. Moorehead, and cleared and developed a farm. Later in life he went to live with a daughter in Big Lick Township, where he died. The Morris family came from Stark County to Hancock at the same time that the Moorehead family settled here. John E. Moorehead married Catherine Morris, a daughter of Mahlon Morris. She died in Portage Township in February, 1891. Her husband survived until May, 1908. At one time he owned 370 acres of fine land. They had six children and five of these are living.

Samuel E. Moorehead obtained his education in the country schools and has made farming and stock raising his main industries ever since and is numbered with the successful agriculturists of the township. He was married August 16, 1883, to Miss Sophronia Deter, a daughter of Jacob and Mary J. (Lewis) Deter. The mother of Mrs. Moorehead died at North Baltimore, in Wood County, O., in 1905. For a number of years Jacob Deter was a prominent farmer but he now lives retired at North Baltimore. After marriage, Mr. and Mrs. Moorehead went to housekeeping on the Jacob Deter farm and moved from there, in 1905, to his present farm which he purchased in June of that year. Mr. Deter gave Mrs. Moorehead a farm of forty acres, in Section 9, Portage Township, and it was on that place, a part of the old Deter homestead, that Mr. and Mrs. Moorehead lived before coming to their present one. Mr. Moorehead bought forty acres, also in Section 9, and twenty acres, in Section 8, making 100 acres, and this they sold when they came to the old Moorehead homestead. Improvements of various kinds have been made on the farm since then, the most important one being the building of the commodious and substantial barn in 1910, one of the best in the township.

Mr. and Mrs. Moorehead have had seven children, namely: Pearl, who died in infancy; Maude, who died when one year old; Clarence; Mary; John; Florence and Morris, the last named dying in infancy. Mr. and Mrs. Moorehead are members of the United Brethren church at Ten Mile, of which he is one of the trustees. He is a Republican in politics and has served seven years as township trustee and for two years has been a member of the school board, and for the past year has been president of this important body. He is one of the township's representative men.

DAVID A. BIBLER, a well known general farmer and a trustee of Jackson Township, has been a lifelong resident of Hancock County, O., and was born April 14, 1853, on his grandfather's farm in Jackson Township, Hancock County, O., a son of John and Marietta (Smith) Bibler.

John Bibler, father of subject, was born about 1818 in Fairfield County, O., and in 1834 came to Hancock County with his father, Abraham Bibler, who entered 240 acres of land, in three eighty-acre tracts in Jackson Township. His father spent the remainder of his life here engaged in farming. The mother of our subject was a native of New York state and came to Hancock County, O., during her girlhood.

David A. Bibler spent his early boyhood on the farm in Jackson Township, where his grandfather settled, and in 1866 came with his parents to his present farm, where he was reared and has since lived. He has always followed farming and resides on a tract of sixty-five acres located two miles west of Houcktown, on the Houcktown road, and also is the owner of a tract of fifteen acres located about two miles north of where he lives. Mr. Bibler learned the trade of a mason with Joseph Alge of Findlay, O., and with the assistance of Albert Sampson did all of the work on his new brick residence, which was erected in 1906.

Mr. Bibler was married to Martha E. Swinehart, who is a daughter of George Swinehart, and they have four children living: Charles E., who married and has two children—William and Thelma; Homer, who is engaged in farming, married Grace Claybaugh; Oscar L., who lives two miles east of his father's farm; and Ray, who lives with his parents. Mr. Bibler is a member of the Grange, in which he has served as treasurer. He belongs to the Baptist church. In politics he is a Democrat and in 1910 was elected a trustee of the township.

WILLIAM M. KAGEY, president of The North Side Department Store Company, carrying on a very large and constantly increasing business, with quarters at Nos. 818-822 N. Main Street, Findlay, O., has been a resident of this city since 1892, but was born at Mifflin, Ashland County, O., July 18, 1867. His parents were John C. and Elizabeth (Kohler) Kagey.

The late John C. Kagey came to Findlay from Ashland County, in 1892, and for a time operated a planing mill at Ashland, later was in the grocery business and still later in the shoe line. He died in 1898, having survived his wife six years.

When William M. Kagey was three years old, his parents moved from Mifflin to Ashland, O., where he attended school until he was sixteen years of age, leaving then in order to begin to learn the grocery business. He was a grocery clerk at Ashland for seven years before coming to Findlay, where he was in the grocery line as a merchant up to the organization of The North Side Department Store, in February, 1907. Of this enterprise he is president and C. F. Fisher is vice-president. They have an abundant capital and handle groceries, dry goods, shelf hardware, patent medicines, granite and tinware, and employment is afforded eleven people. It promises to become one of the most important general stores in the city, its managers and owners being practical, trained men in the mercantile line. The business is incorporated with six stockholders and a working capital of $10,000.

Mr. Kagey was married to Miss Frankie McBride, of Wooster, O., and they have one child, Ralph. He belongs to the order of Maccabees.

ELBERT B. AUTEN, druggist, who has been identified with the business interests of Rawson, O., for the past twenty years, was born in Knox County, O., December 4, 1867, and is a son of Clinton and Mary (Harbin) Auten.

Clinton Auten was born in Pennsylvania and was a son of J. C. and Rebecca Auten, with whom he came to Ohio and settled on a farm in Knox County. He learned the blacksmith trade and later purchased a farm on which he raised quantities of fruit, in Knox County, and died there in 1870. He married Mary Harbin, who was born in Guernsey County, O., where her father followed the trade of a cooper. She resides with her son at Rawson.

Elbert B. Auten was reared in Knox County and attended the public schools. In 1890, after preliminary study, he entered the Ohio Normal University at Ada, O., and was graduated there in 1891, with his diploma as a pharmacist. His first professional position was at Cardington, O., and from there he came to Rawson and in 1902 he purchased his present place of business and has been identified with the leading interests of this section ever since. In politics he is a Democrat and on that ticket has been elected to responsible offices, for the past fifteen years having served as city treasurer and for four years prior to 1901 was also treasurer of Union Township.

In 1895, Mr. Auten was married to Miss Rachel Buckwalter, of Knox County, and they have two children: Agnes and Mary. Mr. and Mrs. Auten are members of the Methodist Episcopal church at Rawson, of which he has been a trustee for ten years. For fifteen years he has been a member of the Masonic fraternity, identified with Lodge No. 418, at Rawson, of which he has been worshipful master. Mr. Auten is widely known and is one of the town's most reliable and useful men.

J. P. MARQUART, a representative citizen and retired farmer of Van Buren Township, Hancock County, O., of which he is a trustee, owns 105 acres of valuable land for which he receives a satisfactory cash rent.

He was born in this township, August 23, 1854, and is a son of Philip and Elizabeth (Heckler) Marquart.

Philip Marquart was born in Hesse Darmstadt, Germany. When eighteen years of age he came to Amreica, landing at the port of New York in 1846 and came directly to Hancock County, O. He married Elizabeth Heckler, a daughter of Andy Heckler and they had five children: Mary, J. P., Catherine, J. G. and J. W., both daughters being now deceased. All the children were born on the old home farm of eighty acres, situated in Section 16, Van Buren Township. Philip Marquart acquired other land. He bought forty acres which adjoined the home farm and later eighty acres more and also the 105-acre farm now owned by his son, J. P. Marquart, together with property in Jenera which he gave to his daughters. He was a very industrious man and had excellent judgment and made his investments carefully. He cleared up his home farm and built his log cabin on the first spot cleared, and as he recognized the value of drainage he put down wooden drain pipes according to the best known methods of the time and thereby made his land very productive. In 1864 he built a comfortable frame house which is still standing. Later he moved to Jenera but his wife died soon after, in 1900, and he then returned to the farm with his son William and lived there until his own decease, which took place in March, 1910. He attended the Lutheran church and was always very liberal in his donations to the same. He was a Democrat.

J. P. Marquart, with his brothers and sisters, attended a German school in Van Buren Township and then worked for his father on the home farm until he was twenty-four years of age. After he married he settled on the present farm. All of the land is tillable except ten acres yet in woods. Mr. Marquart built a new house and remodeled the barn and other farm buildings and also attended to the draining of the land and carried on farming and stock raising until 1908, when he retired from business activity.

Mr. Marquart married Miss Maggie Rettig, a daughter of John and Catherine (Piper) Rettig. She was born in Van Buren Township. Her parents came from Germany in 1836 and bought a farm of forty acres in Van Buren Township and when she was eleven years old they moved to Madison Township, buying eighty acres of land, where the father still lives, being now over eighty years of age. The children of Mr. and Mrs. Rettig were: Lizzie, Maggie, Adam, Catherine, Philip, Samuel, George, Henry, Minnie, Charles, Emma and Mary, and all of these who lived to maturity received a farm from their father.

Mr. and Mrs. Marquart have three children, as follows: Matilda, who married Edward Wilch, of Eagle Township and they have three children—Ida, Fairy and Mabel; Mary, who married William Wertenberger, and they have two children—Effie and Roy; and Lucinda, who married Adam Wilch and they have one child, Fern. Mr. Marquart and family are members of St. Paul's German Lutheran church of Van Buren Township. He has always voted the Democratic ticket. He is a man of very high standing in his township and served one year on the school board and twelve years as township trustee.

SAMUEL H. BOLTON

ERNEST W. HOPPER, a leading business man of McComb, proprietor of a general mercantile establishment, was born in Wood County, O., between Bowling Green and Pemberville, December 26, 1871, and is a son of William and Matilda (Gorrell) Hopper.

William Hopper was reared in Wood County, where he became a farmer. His death occurred in 1879, when aged forty-four years. He married Matilda Gorrell, who now resides in Bowling Green. They had five children born to them, as follows: George, who is deceased; Frank, who is in the clothing business at Bowling Green; Ernest W.; William A.; who is in business at Bowling Green; and Nellie, who is the wife of J. F. Crippen, who is with the street railway company of Cleveland.

Ernest W. Hopper was but eight years old when he lost the protecting care of his father. He attended school at Bowling Green until he was about fourteen years of age and then became a clerk in a grocery store and thus gained the experience that encouraged him to embark in the grocery business for himself and for three years he conducted a grocery at McComb. In 1894 he disposed of his grocery stock, going then to Toledo, where he completed a business course. On returning to McComb in 1895 he purchased a half interest in the dry goods firm of Ewing & Hull, Mr. Hull retiring. The new firm, known as Ewing & Hopper, continued in business until 1902 when Mr. Hopper, through close application to business, was able to purchase the entire stock which now consists of general merchandise, a fine stock of dry goods, carpets and furnishings, and through good judgment and honorable methods he has developed a large business which has still better prospects for the future. For twenty years he has been identified with the best interests of McComb and his standing both as a business man and citizen is exceedingly high.

In 1892, Mr. Hopper was married to Miss Blanche McDonald, a daughter of Robert and Susan McDonald, the latter of whom is deceased. Mrs. Hopper was reared and educated at McComb. They have two children: Lulu and Richard, aged respectively sixteen and ten years. In politics Mr. Hopper is a Republican, but has accepted no political position except membership on the school board. He is identified with the Knights of Pythias and the Maccabees.

SAMUEL H. BOLTON, postmaster at McComb, O., of which place he has been a resident for the past twenty-five years, is an honored member of John Howard Post, No. 154, Grand Army of the Republic, having bravely won a right to this comradeship through years of valorous service as a soldier in the Civil War. Mr. Bolton was born in Stark County, O., January 10, 1845, and is a son of John and Elizabeth (Houk) Bolton.

Both parents of Mr. Bolton were born in Dauphin County, Pa., where they were married and then came to Stark County, O. There John Bolton worked at the carpenter trade until 1846, when he decided to turn his attention to farming, having had some previous experience in Stark County, and after coming to Hancock County he invested in 145 acres of land on the Blanchard River. Later he moved from there to five miles west of Benton Ridge, on the county line of Putnam County, and there his first wife died when about seventy years of age. The father then moved to Findlay where his death occurred when in his seventy-eighth year, and both he and first wife were buried in the Clymer Cemetery. Eight children were born to John and Elizabeth Bolton, as follows: Reuben, who was a minister of the Church of God, died at Findlay, in the midst of usefulness; Cyrus S., who is a retired minister of the Disciples church, at Davenport, Neb.; John Henry, who is a farmer, residing near New London, Ia.; Amanda, who is the wife of Levi Hummon, of Leipsic; Michael, who died at the age of twelve years; Samuel H.; Benjamin F., who is a retired minister of the Disciples church; and one that died in infancy. Three of the above family served in the War of the Rebellion—Cyrus being a member of Co. F, 21st O. Vol. Inf.; John H. serving under Col. William Gibson, in the 49th O. Vol. Inf.; and Samuel H., being a member of Co. D, 99th O. Vol. Inf., all surviving the many hazards of war and living useful lives after their patriotic services were over.

Samuel H. Bolton attended the district schools in his boyhood and then went to work on the home farm which he left in order to take up arms for his country. His regiment was attached to the Army of the Cumberland and the first great battle in which he participated was that of Stone River. He was engaged also at Chattanooga and Lookout Mountain and was with his command under General Thomas on the march to Atlanta. He was then connected with the Signal Corps at General Sherman's headquarters after the memorable march to the sea, and from there marched to Goldsboro and then to Raleigh, N. C., and was in that city at the time of General Johnson's surrender. He remained in the army until the close of the war and took part in the triumphant review at Washington, D. C., and was honorably discharged at Gen. Sherman's headquarters at St. Louis, Mo., July 11, 1865.

Mr. Bolton then returned to Hancock County and for twenty years followed farming successfully on the old homestead and then removed to McComb. Ever since he has been more or less interested in building cement tanks, taking contracts for the same all over the country. He has been a lifelong Republican and on May 7, 1906, he was appointed postmaster at McComb. This is ranked as a third class office and Mr. Bolton has proved a very popular public official.

In 1866, Mr. Bolton was married to Miss Lucretia Moffitt, a daughter of Charles and Elizabeth Moffitt, of Union Township, Hancock County, O., and nine children have been born to them: Mary Elizabeth, Cora O., Ella, William M., John A., Elmer, Elva, Blaine and Nellie Grace. Mary Elizabeth married Wilson Boyer, a very successful farmer of Blanchard Township, and they have four children: Gayle, Carroll, Catherine and Robert. Cora O. and Ella are both popular teachers, the former in the public schools of Cleveland and the latter at Lima. William M. Bolton is principal of one of the public schools of Cleveland. He was educated at Ada, O. He married Miss Pearl Conine, at that time a teacher at McComb, and they have two children, Dorothy and William. John A. Bolton was educated at Ada, O., and Ann Arbor, Mich., and subsequently was graduated in the class of 1910, at the Western Reserve Medical College and is serving as an interne in a hospital in Cleveland. Elmer, who is a member of the present senior class of the medical department of the Western Reserve, attended the Ohio Normal University and other excellent schools. Elva, who was also educated at Ada, O., is a teacher in the Cleveland public schools. Blaine, who is a graduate of the Findlay High School, is assistant postmaster at McComb. The youngest of the family, Nellie Grace, died in infancy. William M. Bolton of the above family served as a member of the First O. Vol. Cav., in the Spanish-American War, enlisting at Cleveland. For many years, Samuel H. Bolton has been identified with the Masonic fraternity. He is a member of the Church of God. This is one of the prominent and representative families of Hancock County.

CARL KOBE, a representative business man of Findlay, O., a dealer in pianos and musical instruments, with fine quarters in the Niles Block, has been a resident of this city since 1872, coming from Saxony, Germany, where he was born on October 9, 1853. His parents were Hinrich and Johanna (Hornung) Kobe.

Hinrich Kobe never came to America. He was a contractor in mine excavation for many years and was the only man in that section at that time, who had the courage and enterprise to use dynamite for blasting. Later he was given a position as mail carrier. After his death his widow began to listen to the urgings of her son, Carl Kobe, to join him in America and finally consented to cross the Atlantic Ocean, but died in 1900, four weeks after reaching Findlay.

Carl Kobe left his native land when he was over eighteen years of age and came directly to Findlay, where his uncle, Fred Hornung, was already located. He had learned the brick and stone mason trade in Germany and easily found employment at the same and continued until other business opportunities opened up more to his liking, but for a long time he was a well known and successful contractor here. He was interested in the line of life insurance for a time and still handles risks for the Home Life Company of New York. A natural musician he soon became identified with musical organizations at Findlay and for eighteen years or more played brass and string instruments in the orchestra at the Findlay Opera House. In 1906, in partnership with his son, Karl P. Kobe, he embarked in the piano business, the latter being a practical piano tuner and maker, having learned the trade in a piano factory at Van Wert. Mr. Kobe is interested in other industries. In 1887 he started the first steam laundry at Findlay, which was located where the McManus mills now stand. He has invested carefully in property at Findlay and is one of the substantial citizens of the place. In his political sentiments he is a Republican and his value as a political factor has been recognized by his party and many times they have made him a member of both the central and executive county committees.

Mr. Kobe married Miss Minna Fillwock, a native also of Germany, and they have three children: Karl P., Emma and Ida. With his family he belongs to the German Lutheran church, of which he is treasurer and in which he is the leader of the choir. He is identified with the Masonic fraternity.

SAMUEL STOUFFER, a prominent farmer of Hancock County, O., who, with his wife, owns 265 acres of valuable land, lying in Washington and Portage Townships, was born on his father's farm in Fayette County, Pa., March 9, 1846, and is a son of Joseph and Nancy (Dobler) Stouffer.

Joseph Stouffer was born in Northampton County, Pa. He was a cabinetmaker by trade and in those days the making of coffins by hand work was a large industry, and charges for the construction of the same, of black walnut, were regulated by the number of feet, the price being one dollar a foot. From his native county he moved into Fayette County and married Nancy Dobler, and in 1855 they came to Washington Township, Hancock County. This farm was about one-half cleared at that time and here they lived the remainder of their days. His death occurred in 1891, when aged seventy-nine years, and she survived until 1895. They had the following children: Mary J., who is deceased, was the wife of Cyrus Eckles, also deceased; Levi, who died in infancy; Henry D., who is in the hardware business at North Baltimore, O.; Samuel; Sarah, who is the wife of James Slosser, of Washington Township; Susann, who is the wife of John S. Stoner, of Westmoreland County, Pa.; Josiah, who is engaged in the shoe business at Bloomdale, O.; Catherine, who lives in Washington Township; Jacob W., who is a resident of Findlay; and Magdalena, who died young.

Samuel Stouffer remembers the journey to Hancock County when the trip was made over an early railroad into Findlay, when the old-fashioned iron rails were spiked to a 4x4 plank, the best method that had yet been evolved. He grew to manhood in Washington Township, spending his early years in clearing up the farm and in helping as he grew older, to improve and cultivate it. He had little chance to attend school except during the few winter months when farm work had to be suspended. In early manhood he went to Fostoria with the intention of learning the harnessmaking trade, but subsequently decided to return to the country and has followed agricultural pursuits ever since. After he married he settled on the present farm which is part of the old John H. Stoner estate. He bought additional land at a later date and has done considerable building and improving here. He carries on general farming and stock raising. Mr. Stouffer has additional interests and is a stockholder in the Union National Bank at Fostoria.

On March 26, 1868, Mr. Stouffer was married to Miss Sarah J. Stoner, a daughter of John H. and Elizabeth (Overholt) Stoner, who had come to this section as pioneers from Westmoreland County, Pa. They were well known people. Mr. Stoner died January 8, 1867, aged forty-eight years. His widow survived until March 3, 1898, reaching her seventy-seventh year. They had four children, namely: Abraham O., of Washington Township; Sarah J., the wife of Mr. Stouffer; Anna E., wife of A. Purkey, of Bloomdale, O.; and Mancinus, who died June 6, 1895, aged thirty-seven years. To Mr. and Mrs. Stouffer two children were born: Cora M., who is the wife of Charles Bricker, of Washington Township; and Anna M, who is the wife of T. J. Manecke, who operates one of his father's farms. They have two children: Florence E. and Lela Leona. Mr Stouffer and family are members of the United Brethren church, of which he has been a trustee for the past forty years. In politics he is a Republican, and he has served two terms as township trustee.

ALBERT BURSON LYON, who is engaged in general farming and stock raising on a farm of 105 acres, located in Section 2, Allen Township, Hancock County, O., is one of the representative citizens and substantial farmers of the community in which he lives. He was born April 8, 1869, on a farm just east of his present one, and is a son of Lewis S. and Sarah (Weisel) Lyon, the latter of whom died in 1899. The father of our subject was born in Harrison County, O., and at the age of thirteen years came to Allen Township, where he was reared, and subsequently engaged in agricultural pursuits until 1903, when he removed to North Baltimore. He became a man of affluence, owning 340 acres in Allen Township, the greater part of which contains oil in large quantities.

Albert Burson Lyon, who is familiarly known in Hancock and Wood Counties as Burt Lyon, spent his boyhood days on his father's farm in Allen Township, and has made farming his life occupation. The first five years of his married life were spent on his father's farm, and in the fall of 1897 removed to his present property, which he purchased from Lloyd Weisel, and which was formerly known as the Frederick Henniger farm. Mr. Lyon has made extensive improvements on the place, remodeling the house, thoroughly tiling the land, and in various other ways has made changes. He carries on farming in a general way, raises considerable stock, having on hand fifteen head of cattle, eight head of horses and eighty head of hogs, making a specialty of Chester Whites.

On December 24, 1892, Mr. Lyon was united in marriage with Alice Havard, a daughter of Evan Havard of Sandusky County, O., and of their union have been born three children: Elva Anna, Ada, and Mabel Margaret.

Mr. Lyon is politically a Democrat, has served one term as trustee of his township, and in June, 1910, served as a delegate to the Democratic County Convention at Findlay. He is a member and a trustee of the United Brethren church, of North Baltimore, O.

WILLIAM J. HENNINGS, a prominent citizen of Portage Township, Hancock County, O., who is serving as a member of the township board of trustees, resides on his well cultivated farm of 160 and one-half acres, which lies in Section 7 and was formerly known as the old Wall farm. He was born in Portage Township, March 15, 1861, and is a son of William and Kathern (Perskey) Hennings.

Both parents of Mr. Hennings were born in Germany and they came to America on the same vessel and shortly after landing were married in New York. William Hennings was a shoemaker by trade and he worked at the same in Hancock County until the last year of the Civil War, when he enlisted in the Union army and served for nine months. He acquired a farm in Portage Township and resided there during the rest of his active life and then retired to McComb, where his death occurred. His wife had died previously in Portage Township.

William J. Hennings was reared in Portage Township and has devoted himself to agricultural pursuits. After he married he operated his father's farm for two years and then bought a farm of forty acres in Milton Township, Wood County, on which he remained for one year and then sold and purchased ninety acres in Liberty Township, Wood County, and continued on that place for eight years, having previously rented land there for about six years. When he sold his ninety-acre farm in Liberty Township, in 1907, he purchased his present farm in Portage Township, Hancock County and devotes it to general farming and stock raising.

Mr. Hennings married Miss Orpha Smith, a daughter of David Smith. She was born in Crawford County, O., but came to Hancock County as a girl. Six children were born to Mr. and Mrs. Hennings: Roxie, Arthur, Charles, Minerva, Raymond and Lettie. The beloved mother of this family died in October, 1907. Mr. Hennings is a member of the North Baltimore English Lutheran church. In politcs he is a Democrat and on the Democratic ticket he was elected township trustee in the fall of 1909 and assumed the duties of office on January 1, 1910.

M. M. CARROTHERS, M. D., who has been engaged in the practice of medicine and surgery for thirty-eight years, has spent twenty-two years of this period at Findlay, O., where he is also identified with those things which interest an enlightened man and good citizen. Dr. Carrothers was born on a farm in Crawford County, O., February 8, 1845, and is a son of John and Elizabeth (Laird) Carrothers, both of whom are deceased.

Reared on the home farm and educated in the country schools, Dr. Carrothers reached manhood and then taught school before beginning his medical studies, three terms in Crawford County and two terms in Richland County. His medical reading was done in the office of Dr. A. E. Jenner, of Crestline, O., and in February, 1872, he was graduated from the medical department of Wooster University, and in 1882 he was graduated from Adelbert College, connected with the Western Reserve University at Cleveland. He entered into practice at Sulphur Springs, Crawford County, O., and from there came to Findlay. Aside from his professional interests, Dr. Carrothers has led a busy life in other directions. As early as his age permitted he became a soldier, following three older brothers into the army during the Civil War, and for four months was a member of Co. F, 163rd O. Vol. Inf. In 1904 he was elected on the Republican ticket to the Ohio State Legislature and completed one term; has served many years as a member of the Findlay Board of Health and for eight years has been a member of the city council and is now in his third term as president of this body. He is a broad-minded, liberal man, one who, with judgment and discretion, champions movements designed to promote the general welfare.

Dr. Carrothers was married to Miss Mary Wert, who was born in Crawford County, O., a daughter of David Wert, and they have four children: May, who is the wife of Dr. W. B. Keator, of Findlay, O.; Eva E., who is the wife of Rev. A. E. Renn, who is pastor of a Lutheran church at Atchison, Kans.; and John R. and Alta B., both of Findlay. The family is connected with the Trinity Lutheran church, in which Dr. Carrothers is an elder.

HON. CHARLES I. MOORE, mayor of Rawson, O., one of the town's most enterprising and substantial citizens, was born near Rawson, in Union Township, Hancock County, April 6, 1873. His parents were George and Mary A. (Fox) Moore.

George Moore was born on the county line of Franklin County, O., December 31, 1828, and was a son of Edward Moore, one of the old residents of Franklin County. When twenty years of age, George Moore came to Hancock County and settled on the farm in Union Township on which he lived until he moved to Rawson in 1890, living at the latter place until his death, which occurred March 31, 1909. His widow, a native of Hancock County, still survives and resides with her son, Mayor Moore.

Charles I. Moore was reared in his native county and was educated in the schools of Union Township and Rawson. He has been a resident of this town for the past two years and has been a considerable factor in its development. His business interests here are important, including the ownership of property and the operating of a gents' furnishing goods establishment and a large and finely stocked grocery store. He has been active in Democratic politics and in the fall of 1909 was elected president of the city council, and on April 1, 1910, assumed the duties as mayor of Rawson.

Mr. Moore was married first, December 28, 1898, to Miss Christina Harpst, who died July 1, 1907. She was a daughter of Jacob and Amanda Harpst, farming people of Union Township. Three children survive her: George R., Price H. and Lloyd E. Mr. Moore was married second on May 12, 1910, to Miss Vera Easterly, a daughter of William A. and Jennie Easterly, of Gibsonburg, Sandusky County, O. Mrs. Moore is a member of the Christian church at Gibsonburg, O. He is identified fraternally with the Masons and the Odd Fellows, having united with the former body in 1907 and belonging to the latter organization for the past sixteen years.

E. L. DILLER, who has been postmaster at Jenera, O., since May, 1909, owns a one-third interest in the Diller & Pifer general store in that village, and was born June 11, 1878, at Bluffton, O., and is a son of John G. and Elizabeth (Shumaker) Diller.

John G. Diller was a native of Putnam County, O., and for many years followed farming in that county, residing north of Bluffton. He died at Pomona, Calif., in 1908, at the age of sixty-seven years. His marriage with Elizabeth Shumaker, who died in 1881, resulted in the birth of eight children, all of whom are living. Politically he was a Democrat, and he and his wife were both members of the Mennonite church.

E. L. Diller was reared at Bluffton, O., and after completing a course of study at the public and high schools of that city, spent one year at the Ohio State Normal at Ada, and Columbus Grove, and two years at Dalton, O., and in 1905 came to Jenera, where he embarked in his present business. He served first as assistant postmaster under his brother, William Diller, who was at that time also interested in the Diller & Pifer general store at Jenera, and since May, 1909, has been postmaster at this place.

In November, 1905, Mr. Diller was joined in marriage with Bessie Thornton, who is a daughter of James Thornton of Columbus Grove, and they have two children: Dolores and Harry Lemont Diller. Mr. Diller is a member of the Methodist Protestant church at Jenera.

FRANK S. ROBINSON, one of the prominent men of Hancock County, O., and one of the most successful and progressive farmers, owns 320 acres of valuable land, eighty acres in Pleasant Township, being his home farm, eighty more being situated in Blanchard Township, while 160 acres lie in Putnam County.

Mr. Robinson was born in Richland County, O., April 25, 1865, and is a son of William and Mary (Kahl) Robinson.

William Robinson was born in Richland County and died there. His parents were of English birth and were pioneers in that county. They had two sons, William and James S., the latter of whom became one of Hardin County's leading men. He learned the printer's trade and then entered journalism. He established the Kenton Republican and continued its editor for a number of years. In 1880 he was elected to the office of Secretary of State, in Ohio, and served two terms and for two terms was a member of Congress. He became a man of wealth as well as public importance and entertained lavishly at his hospitable home, his residence taking up a whole block at Kenton. He married Hester Carlin, of Findlay, for his second wife, and a son and daughter survive them.

Frank S. Robinson is one of a family of ten children, in which there were five sons and five daughters, he being the sixth in order of birth. Clara, the eldest, is the wife of I. Q. Haverfield, of Mansfield, O. Florence never married. Charles W. is a farmer in Richland County and married Belle Pittinger. James C. is a farmer in Putnam County and married Flora McClish. Jennie, who is deceased, was the wife of Morris Shively, of Richland County, and is survived by two children: Tola and Harry. Kate is the wife of Paul Roethlisberger, of Mansfield. Etta is the wife of Walter Y. McGuire, of Ashland County. George resides on the old farm in Richland County. He married Eliza Myers. Walter, the youngest, married Irene Pittinger. He is a farmer in Richland County.

Frank S. Robinson obtained his education in the Richland County schools and remained on the home farm of 140 acres until January, 1883, when he went to Deshler and in April to Blanchard Township, Hancock County, where he resided for seven years. Since his marriage, in 1890, Mr. Robinson has lived on his present farm of eighty acres in Pleasant Township. This is one of the best improved properties in this section of the county. The handsome, modern residence is beautifully situated, and the barn, recently erected, is equipped with what is known as the Shawver's Patent, being the first one introduced in the township. Mr. Robinson follows scientific methods and is credited with being the most uniformly successful agriculturist in this part of Hancock County.

On December 31, 1890, Mr. Robinson was married to Miss Nannie M. Davis, the youngest daughter of Alfred Davis, a substantial citizen of Blanchard Township. They have an adopted son, Tola, a nephew of Mr. Robinson, a youth of brilliant mind and with bright prospects. In 1910 he graduated from the McComb High School, with the highest honors of his class and is preparing to enter the Ohio State University, at Columbus, in the fall of the same year.

In politics, Mr. Robinson is a Republican and in 1908 he was the nominee of his party for the state legislature. While defeated he had a flattering following, running 250 votes ahead of President Taft, in the county. He is a member of the Hancock County Central and Executive Committees and was elected to the latter by a vote of twenty out of a possible twenty-one, although he had not sought the honor. For more than fifteen years he has served actively in Republican politics, has been a delegate to two state conventions and was a delegate to the state convention which was

REV. HENRY C. DE RODES

MRS. ELIZABETH A. DE RODES

held at Columbus, August 26, 1910. He is a member of McComb Lodge, No. 179, Knights of Pythias. He was reared in the Methodist Episcopal church.

REV. HENRY C. DE RODES, a retired minister of the radical branch of the United Brethren church, has been a resident of Portage Township, Hancock County, O., since 1851, and is a veteran of the great Civil War. He was born on a farm in Columbiana County, O., May 6, 1828, and is a son of Martin and Elizabeth (Pentz) De Rodes.

In large measure Mr. De Rodes is a self made and self-educated man. Although now he contributes interesting articles to different newspapers which are read by hundreds of people, he had but few opportunities in his youth to train his mental faculties. In his day country boys began labor on the farm when young and continued with but short intervals, usually several months in the winter, until they reached manhood. He remained on the home farm until he was twenty years of age and then went to Cincinnati where he worked in a factory until 1851, when he came to Hancock County, and located in Portage Township, where his brother, Samuel De Rodes, and a brother-in-law, Andrew Nigh, were then living. Shortly afterward, in partnership with his brother, he bought ninety acres of land on the north side of the road, in Section 4, and also the eighty acres on which he now lives, on the south side, directly across the road from the other farm. This eighty-acre tract, which subsequently became his own property, is situated near the Ten Mile Church. He has followed general farming for many years and preached every Sunday, being an acceptable local minister of the United Brethren faith.

In August, 1862, Mr. De Rodes enlisted for service in the Civil War, entering Co. D, 99th O. Vol. Inf. and remaining in the army until the close of the war, his commanding officer being Colonel Bope. He was honorably discharged and was mustered out at Camp Dennison, O. The hardships endured during this long period had shattered his health, impairing his eyesight, and for three years afterward he was more or less of an invalid. He subsequently recovered and for many years afterward was an active and busy man. All the buildings now on his farm he erected, some of the former ones having been destroyed by fire. In this way he lost his former residence, in 1892, and in 1902 his barn was destroyed by lightning.

Soon after coming to Hancock County, Mr. De Rodes was married to Miss Elizabeth Archer, a daughter of James Archer, of an old pioneer family, and they have had eleven children. Of these, Nancy married Henry Brown. Mary married George Brainard. Awilda died in infancy. Martin died aged eighteen months. Elsie married Lewis Brown and they live in Toledo. Henrietta married Newton Tarr, of North Baltimore. Ora F. lives at home. Joseph went out to Arizona where he is interested in a copper mine. Della and Harry reside with their parents. A babe died unnamed. The family belongs to the United Brethren church. Mr. De Rodes has never been very active in politics but when elected trustee of Portage Township, served with honesty and efficiency. He is widely known and universally respected and esteemed.

JOHN S. RUHL, harnessmaker and dealer in harness and leather goods and engaged in general harness manufacturing, with quarters in the Rawson Block, 321 South Main Street, Findlay, O., has been a resident of this city since 1861. He was born at Canton, Stark County, O., March 30, 1843, and is a son of John G. and Susanna (Dickerhoff) Ruhl.

The father of Mr. Ruhl, Rev. John G. Ruhl, was a minister in the German Reformed church and during the boyhood of his son, accepted a clerical call to Marion, O., and from there, in 1861, came to Findlay, and became pastor of the East Main Cross Street German Reformed church. Both he and wife died at Findlay.

John S. Ruhl was reared in Marion County, O., and secured his schooling there. In October, 1861, he enlisted for service in the Civil War, entering Co. H, 66th O. Vol. Inf., of which he remained a member until the close of the war. He participated in many of the thrilling events of those years, accompanied General Sherman to the sea and was on many a long march and terrible battlefield, escaping with two slight injuries. He was honorably discharged at Washington in 1865. Mr. Ruhl then returned to Findlay, where he was elected city marshal and served in that office for nine years and then was made deputy U. S. marshal for five years more. In 1877 he went into the harness business at Findlay and is sole proprietor of the Findlay Harness and Leather Company and has given his entire time to it with the exception of the period when he served as deputy sheriff under Ex-Sheriff Myers.

Mr. Ruhl married Miss Helena Hock, a daughter of Philip Hock, who was born in Germany. They have one child, Flora Ellen, who is the wife of John F. Pogue, who is president of the Hancock Stone Company. Mr. Ruhl is a member of Hancock Lodge No. 73, Odd Fellows, and belongs also to the G. A. R.

GEORGE W. STALL, a member of the prominent business firm of Stall Bros., tile manufacturers, at Arcadia, O., is one of the representative citizens of this place. He was born on his father's farm in Big Lick Township, Hancock County, O., December 29, 1873, and is a son of John F. and Nancy (Roller) Stall.

John F. Stall was born in Carroll County, O., and was a boy when he accompanied his parents, George and Mary Stall, to Hancock County. They settled in Big Lick Township, five miles south of Arcadia, taking up land in the woods. Both George and Mary Stall died at Findlay. They had the following children: Barbara, Margaret, Belle, Sarah, Samantha, Jane and John F., the last named being the only son. He grew to manhood in Big Lick Township and helped clear the land and later purchased a farm for himself and continued to operate it until 1904, when he retired to Arcadia. He married Nancy Roller, a native of Big Lick Township and a daughter of Wilson Roller, one of the pioneers of that section. Seven children were born to that marriage, as follows: Wilton J.; Flora Adell, who is the wife of R. B. Russell; and Edwin, Arthur J., George Wilson, Thomas J. and William H.

George W. Stall attended the district schools and remained on the home farm through boyhood and then worked for five years in the oil fields and after that purchased the hardware store of A. M. Nye, at Arcadia. He conducted the hardware business for six years and then became interested in tile manufacturing and through satisfactory business transactions, in June, 1910, he and his brother, W. H. Stall, became the proprietors of the tile manufacturing plant covering eight acres, situated on the Lake Erie & Western and Nickel Plate Railroads, while the firm of Stacy & Son, through the trade, took the hardware store. They give constant employment to six men and the output is drain tile.

In March, 1893, Mr. Stall was married to Miss Nora B. Overholtzer, a daughter of John Overholtzer, of Marion Township, Hancock County, and they have three children: Marie, Rachel and Marjorie. Mr. and Mrs. Stall are members of the Methodist Episcopal church. In politics he is a Democrat and has served acceptably in the city council. He is identified with the order of Modern Woodmen of the World at Arcadia.

ELI SPITLER, a representative citizen of Allen Township, Hancock County, O., who resides on his valuable farm of eighty-seven acres, which lies on the Perrysville turnpike road, one mile north of Van Buren, was born on a farm, in Crawford County, O., October 25, 1839, and is a son of Samuel and Annie (Bretz) Spitler.

When Eli Spitler was one and one-half years old, his parents moved to a farm in Allen Township, Hancock County, which is now occupied by S. D. Spitler, and there he grew to manhood and remained on the home farm for some years after marriage. In 1880, Mr. Spitler came to his present farm, in Section 6, where he carries on general farming and stock raising. His property is well improved, Mr. Spitler having built his large frame house and substantial barns some years since. The T. & O. C. Railroad runs north and south through the center of his land.

In December, 1876, Mr. Spitler was married to Miss Martha Jane Ensminger, who was born in Allen Township, a daughter of Perry Ensminger, and they have six children: Charles, who lives in Toledo, is married and has three children; Clara (Mrs. Holmes), who lives at Deshler, in Henry County, has four children; Cloice, who resides at home; Allan, who lives on a farm two miles northwest of Deshler, is married and has four children; Hattie (Mrs. Bonam), who lives in Oklahoma, has two children; and Daniel, who lives with his wife and child at Waterville, O. Mr. Spitler is a member of the United Brethren church. In politics he is a Democrat and at times he has taken a leading part in township affairs and has served as a trustee and also as a member of the school board.

JACOB T. CRITES, a leading citizen of Portage Township, Hancock County, O., township clerk and an active Republican politician, lives on his valuable farm of 100 acres, which is situated in Section 33, five and one-half miles from Findlay. He was born in Allen Township, Hancock County, May 25, 1868, and is a son of Joseph and Margaret (Doudle) Crites.

Joseph Crites was born and married in Fairfield County, O. He married Margaret Doudle, who was born in Pennsylvania and was brought to Fairfield County in girlhood. In 1860, Joseph Crites and wife moved to Hancock County and both died on their farm in Allen Township. They were worthy people who were respected by all who knew them.

Jacob T. Crites was reared in Allen Township and in boyhood attended the country schools and later spent three years at Findlay College. Farming has been Mr. Crites' main occupation although he taught school very acceptably for thirteen winters in early manhood. In 1894 he moved on his present farm, which then belonged to his father-in-law, and rented the land until 1902, when he bought fifty acres of it and purchased the other fifty in 1908. The barn was on the place when he took possession and in 1906 Mr. Crites erected the attractive modern residence which is now the family home. He has made many other improvements and has been successful in his farm and stock operations.

In 1891, Mr. Crites was married to Miss Blanche Cusac, a daughter of James Cusac, a prominent farmer of Liberty Township, and they have five children: Stella, Violet, Margaret, Alice and Sarah. Mr. and Mrs. Crites are members of the Blanchard Presbyterian church, of which he is treasurer and in which he has led the choir for twenty years. Mr. Crites has taken an active interest in public matters in his township and is more or less of a leader in all of importance. He is a member of the Republican County Committee from Portage Township and since January 1, 1908, he has been township clerk.

OSCAR KIRSTEN, who, in association with his brother, Otto Kirsten, owns and controls the American Mask Manufacturing Company, at Findlay, O., has been so identified since 1884. This concern enjoys the distinction of being the first one of its kind in the United States and in fact there is but one other mask factory in the whole country. Oscar Kirsten and brother were born in Saxony, Germany, the former in 1859, and they are sons of Henry Kirsten.

Oscar Kirsten spent his youth in Germany. In 1880 he came to America, stopping in Cincinnati until 1884, when he came to Findlay, his brother Otto reaching this city one year later. In 1884 the present business was started, its location being on South Main Street in the Headquarters Block, but subsequently removal was made to their present three-story factory, which is situated at the junction of the L. E. & W. Railroad and West Sandusky Street. The business of the firm is the manufacturing of masks of all descriptions and of novelties, such as the imitation joints of meat made use of by butchers for display purposes. This is a very important enterprise, requiring the work of more than forty hands, these being mainly girls, and their trade field is all over the United States and also Canada. The business is a constantly growing one and considerable capital is invested.

CHARLES W. DEEDS, a representative business man of Rawson, O., where he is engaged in a general mercantile business, owns a farm of eighty acres, situated in Union Township, one and one-half miles northeast of this place, which is generally acknowledged to be one of the best managed properties in this part of Hancock County. Mr. Deeds was born on his father's farm in Eagle Township, three miles from Rawson, May 13, 1879, and is a son of Samuel and Martha Deeds. Both parents were born in Hancock County, the father in Union Township, in 1844, and the latter in

Eagle Township, and they live retired at Rawson.

Charles W. Deeds attended the schools of Eagle Township and Rawson and for the past thirteen years has been in business in this town, for seven years conducting his large general store. He carries a very heavy stock of up-to-date goods, including dry goods, groceries, hats, caps and all kinds of floor coverings, and owns his business quarters, a building with dimensions of 150 by 23 feet, located on Main Street. He enjoys the best patronage of the town and of the adjacent country.

Mr. Deeds was married February 28, 1904, to Miss Rosanna Foltz, a daughter of Abraham and Mary Foltz, who were well known people in Union Township. The mother of Mrs. Deeds died at Rawson in 1895, but the father survives. Mr. and Mrs. Deeds have two children: Dortha Louise and Martha Beatrice. Mr. Deeds and family belong to the United Brethren church at Rawson. He is identified with the Odd Fellows, for the past four years having been a member of Rawson Lodge No. 559, and of the Knights of Pythias, Lodge No. 410, in which he has filled every official position and at present is grand past chancellor.

JOHN HELDMAN, a retired farmer and much esteemed citizen of Jenera, O., is the owner of the old Heldman farm, which is located just north of Jenera in Van Buren Township, Hancock County, and was born there December 6, 1849, a son of Michael and Margaret (Arras) Heldman.

Michael Heldman was a native of Germany and at the age of twenty-five years came to the United States and first located in Marion County, O. He was married while there to Margaret Arras, the eldest daughter of Peter Arras, and in 1835, with his wife and child, came to Hancock County, bringing one horse and wagon. He settled on a tract of eighty acres of timber land in Van Buren Township, which now forms part of the present site of Jenera, and there erected a log cabin, which is still standing. This land he cleared, placed in a state of cultivation, and later bought another tract of 120 acres, which is now owned by our subject. He died here at the age of eighty-four years and six months, and his wife died at the age of sixty-six years. They were the parents of seven children, all but the eldest being born in Van Buren Township. They were members of the Lutheran church.

John Heldman was born in the old log house on his father's farm, and there grew to maturity. After his marriage he engaged in farming on the home place, which he greatly improved, and was at one time the owner of 200 acres of fine farm land in Van Buren Township. That section of Jenera which is just north of the railroad, was formerly owned by our subject, who laid out his land in town lots and sold about seventy lots in all. He still manages his farm, although a resident of Jenera, where he built a fine residence about 1889.

In 1888, Mr. Heldman was joined in marriage with Miss Elizabeth Rettig, a daughter of John Rettig, who resides south of Arlington, and of their union have been born the following children: Henry, Emma, Elizabeth, Carl, Katie and Wilhelmine, the last three having all died with diphtheria.

Mr. Heldman is a charter member and

stockholder of the Farmers' Bank Company of Jenera, is politically a Republican, and although not a politician in any sense of the word, has served some years as town treasurer. He is a member and deacon of the Lutheran church.

HENRY B. RADER, ex-county commissioner of Hancock County, O., and a prominent farmer of Pleasant Township, where he owns eighty acres of well improved land, was born in this township, one-fourth mile distant from his present farm, April 24, 1844, a son of John and Elizabeth (Wall) Rader.

The Rader family was established in Hancock County by the grandfather, Henry Rader, who came in 1835 and settled near Van Buren. He was born in Pennsylvania and moved from there to Virginia and later came to Ohio and died in Allen Township, Hancock County, at the age of eighty-two years. He married Catherine Bops, in Virginia, and they had eight children: James, John, David, Adam, Isaac, Henry, Annie Stephenson and Elizabeth Murray, all of whom died in Hancock County except Isaac, Annie and Elizabeth, who died in Henry County.

John Rader was a well known farmer in Pleasant Township. He married Elizabeth Wall, a daughter of Richard Wall, who came from Pennsylvania and settled in Portage Township, Hancock County, two miles east of Mr. Rader's present farm. Richard Wall died at the home of John Rader and wife. He had four children: H. B., Alice, Elizabeth and Millie, the last named being the wife of Adam Rader. All are now deceased. The following children were born to John and Elizabeth Rader: Henry B.; Richard W., who is a farmer in Portage Township, married Lucy Sebring; William, who resides at Hoystville, married Fannie Rider; A. J., who lives in Hillsdale County, Mich., married a Miss Metz; John M., who is a resident of Toledo, married Ida Leonard; Millie, who married Andrew J. Rider, who is a farmer in Pleasant Township; Alice, who is deceased, was the wife of Rev. Leonard; and two that died young.

Henry B. Rader was reared on the farm on which he was born and obtained a common school education. On November 4, 1861, he enlisted in the army, he became a member of Co. K, 65th O. Vol. Inf., enlisting at Findlay and being mustered in at Mansfield. His regiment was attached to Sherman's army and was sent from Mansfield to Louisville, Ky. His first battle was at Shiloh and from there the depleted regiment went to Corinth and after fighting there went on through Alabama back to Louisville, fighting at Crab Orchard and other points. It was at Stone River that Mr. Rader was so seriously injured that he lost his left arm and a recital of the circumstances excite in the reader of the present day sentiments of sympathy and admiration. He was wounded on the field, far from any adequate surgical attention. With the courage and self control that a man might have shown who had already learned these attributes through suffering, this boy of eighteen years walked twenty miles to reach the hospital at Nashville. There his arm was first amputated, January 5, 1862, but it had been so long neglected that a second amputation became necessary and

RESIDENCE OF J. J. SINK

it was repeated ten days later. When it is remembered that surgeons operated at that time with few of the merciful anaesthetics of the present day and practically no disinfectants, it is a subject of wonderment that Mr. Rader had the power of will to watch the operation as would a bystander, as he did. It was some time before he recovered sufficiently to leave the hospital, when he returned home and subsequently attended and later taught school, and has long been numbered with the best informed and broad minded men of this section. He is one of the oldest native born citizens of Pleasant Township and has resided on this farm which he bought in 1867. He had a large acreage to clear and as time has passed has made many excellent improvements, having substantial buildings and comfortable surroundings.

On September 6, 1866, Mr. Rader was first married, the lady being Miss Elizabeth George, a daughter of Joseph George, a prominent farmer of this section, and the living children born to this marriage are: Franklin, who married Mary Conner, has two children, Howard and Nellie; Nevada, who married Isaiah Metzger, of Toledo, and they have two children, Alda and Kenneth; Ida, who married Charles Ewing, of Deweyville, O., and they have four children, Ruth, Helen, Dorothy and Teddy; Ross, who resides at Findlay, married Grace Slaughterback and they have one child, Gerald. The mother of the above family died in 1882. Mr. Rader subsequently married his sister-in-law, Miss Sarah George, and three children were born to them: Dallas, who married Alta Barger, has one son, Elmo, and they reside in Pleasant Township; Theresa, who is the wife of Walter Otto, of Pleasant Township; and Lena, who resides with her parents.

Mr. Rader is a member and a trustee and also treasurer of the Church of God, at Deweyville. In politics he is a Democrat and has served as township assessor and as trustee and also as a county commissioner. He is identified with the John Howard Post, G. A. R., at McComb, O.

J. J. SINK, who operates a farm of 160 acres located on the Houcktown Road in Jackson Township, Hancock County, O., was born August 27, 1847, in Jackson Township, this county, and is a son of John W. and Susan R. Sink, both natives of Pennsylvania. The father was a farmer and blacksmith and after his marriage came to Hancock County, O., where he and his wife both died.

J. J. Sink grew to maturity in Jackson Township and received his education in the district schools. He was reared a farmer and has always engaged in agricultural pursuits, and purchased his present farm of 160 acres from the Struble heirs about five years ago. Mr. Sink is politically a Democrat and has served his township as trustee. He has been a member of the Methodist Episcopal church for the past forty years.

In 1873 Mr. Sink married Miss Lucy A. Struble, who is a daughter of Peter and Mary (Corwin) Struble, who owned and resided on the farm now owned by our subject. Peter Struble was born in New Jersey and his wife in Pennsylvania. Mr. and Mrs. Sink have reared the following children: Maud M., who taught five years in the district schools of Jackson, Eagle and Liberty Townships, married Andrew Altman, a mechanic of Findlay, O., and is the mother of two children—Blanche and Everett; Harley, who is a graduate of the Homeopathic Medical College of Cleveland, O., and has been practicing medicine for the past six years at Columbus Grove, married Sarah Stewart and they have two children—La Verne and Beda Alta; Ethel, who was educated at Mt. Blanchard, taught three years in Delaware and Jackson Townships, married Charles Hauman, who is at present operating a farm of 200 acres, and is the owner of a tract of eighty acres in Jackson Township, where they reside, and they have five children—Mary, Nellie, Margaret, Helen and Leonard; and Oscar O., who has been practicing medicine at Smithfield, O., for one year, is a graduate of the Cleveland Medical College, and married Lillian Sampson, who, previous to her marriage, was a teacher.

HARRY A. GLATHART, city engineer of Findlay, O., with previous experience as assistant city engineer and also as county engineer, is a man well qualified for this responsible position. He belongs to a well known family of Hancock County, of Swiss extraction. He was born at Lawrence, Kans., May 28, 1870, and is a son of Aaron J. and Amanda J. (Strothers) Glathart.

The grandfather of Mr. Glathart came from Switzerland and established the family in Hancock County in 1828. Aaron J. Glathart was born in Hancock County and spent many years here and also resided in Kansas. He was an honored veteran of the Civil War. His death occurred at Findlay in 1909. His widow survives.

Harry A. Glathart was reared and educated at Findlay through a part of his boyhood. He was five years old when his parents came from Lawrence, Kans., back to Ohio and until he was eleven years old the family lived at Findlay and then moved to a farm in Marion Township, six miles east of this city. He attended the country schools until he was twenty-one and then entered the Ohio State University at Columbus, and later he made a special study of civil engineering as well as electrical engineering in the Ohio Normal University at Ada. After leaving that institution he went into railroading, both steam and electric, having his headquarters at different points—Cleveland, Ohio; Hamilton, Ontario, Canada; Kansas City and in Old Mexico. In 1905 he returned from Canada to Findlay and on the Republican ticket ran for county engineer and was elected to that office. He served as assistant city engineer and on January 1, 1910, was appointed city engineer by Mayor Graves.

Mr. Glathart was married to Miss Clara A. Landon, of Wyandot County, O., and they have four children: Theron, Justin, Grace and Clifford. Mr. Glathart is affiliated fraternally with the Masons, the Odd Fellows and the Knights of Pythias and he belongs also to the Sons of Veterans.

NICHOLAS FOX, one of Washington Township's best known citizens and most substantial men, owning farms in Sections 16, 17 and 9, aggregating 540 acres of some of the best land in Hancock County, O., was born in his father's old log house that stood on the home farm in Washington Township, south of Fostoria, July 10, 1848. His parents were William and Catherine (Mails) Fox.

William Fox was a well known pioneer of this section. He was born in Pennsylvania. It is said that he and John Hooper and James Wiseman were the three white men who represented the race in this section of Ohio, coming before Hancock County was organized and long before Findlay had been laid out. They all took up land from the Government, William Fox selecting that lying along the creek in Washington Township, and each cleared his own property, doing the first clearing in all this section. They no doubt faced and overcame many hardships and all have long since passed away. William Fox left many descendants, having been married four times and he became the father of twenty-five children. His first wife died in Pennsylvania and his second marriage might have been in Fairfield County, O., where the Pennsylvania pioneers stopped for a time. Her name was Whaley and she died in Washington Township. He then married Elizabeth Jacobs and after her death, Catherine Mails. Of the children born to the last union there are two survivors: Nicholas and Milton.

Nicholas Fox recalls the school house of his boyhood as a small log building with split log seats and wide fireplace. In those days farmer boys were not given a great deal of time for their books, the clearing and tilling of the soil being duties that could not be put off or avoided and Mr. Fox had a thorough training along these lines. He remained at home until he was married and then started out for himself, going into debt for his first 120 acres which was all in woods. He not only cleared that but the larger part of the rest of his land which he bought from time to time as he was able and as he saw the property was valuable. In 1871 he bought his residence farm in Section 16, from Emanuel Kimmell, and put up all the substantial buildings here and has good buildings on all his other farms, all of which are otherwise well improved. All of his land is under cultivation and all is operated by his own children.

On December 30, 1868, Mr. Fox was married to Miss Mary Gilmer, a daughter of John and Susan (Caster) Gilmer, who were Pennsylvania people, coming from Allegheny County and settling in Delaware Township, Hancock County, where Mrs. Fox was born. To this marriage twelve children were born, six of whom died young. The family record is as follows, including the surviving children and grandchildren: Edward married Bertha Crawford and they live in Washington Township and have seven children: Ralph, Elmer, Mary, Emma, Rose and Bessie, twins, and Edward. John E. married Nannie Wells, now deceased, and they had one child, Lela, who lives with her grandfather. Mollie is the wife of S. E. Noel, of Washington Township, and they have four children: Carle, Wilbur, Mildred and Crystal. William married Etta Nusser and they live in Washington Township and have three children: Waldo, Fayma and Kenneth. Nicholas and Coral reside at home, Nicholas being the farmer of the home place.

JOHN D. BARND, one of the leading agriculturists of Allen Township, Hancock County, O., resides on a farm of 135½ acres near Van Buren, and was born December 11, 1844, on a farm which is part of the farm on which he now lives. He is a son of John and Sarah (Gerlinger) Barnd.

John Barnd came from Perry County, O., in 1832, and settled for a short time on land in Allen Township, but subsequently located on the farm on which our subject was born. He married Sarah Gerlinger, who was born March 31, 1811, in Shenandoah County, Va., a daughter of John and Elizabeth Gerlinger.

At the age of eight years she came to Perry County, O., with her parents and was there reared and married. She was the mother of twelve children, eleven of whom grew to maturity, and died on the farm in Allen Township March 29, 1884. John and Sarah Barnd were members of the Primitive Baptist church, of which their son-in-law, Rev. J. B. Smith, was pastor. John Barnd served over thirty consecutive years as justice of the peace of Allen Township.

John D. Barnd was reared in Allen Township, and has made farming his life occupation. He has resided on his present farm since 1869, having purchased in 1867 thirty-eight acres, to which he has from time to time added small tracts, and is now the owner of 135½ acres of highly cultivated land, all in one tract. Mr. Barnd has made all of the improvements on his place, and is recognized as one of the substantial and successful farmers of Allen Township.

Mr. Barnd was married in 1868 to Emily S. Bushong, a native of Portage Township, Hancock County, and a daughter of Jacob and Elizabeth (Bowhard) Bushong, pioneers of this county, who settled here in 1833. Nine children were born to Mr. and Mrs. Barnd: Sarah Elizabeth, who is the wife of Franklin Daniles of Allen Township; Cloyse M., who is a resident of Allen Township; William H.; Bertie; Arby D., who is now serving as assessor of Allen Township; George A.; Blanche B.; and John Jacob and Nellie, both of whom died in infancy.

MARTIN INSLEY, one of Portage Township's most respected citizens, resides on his valuable farm of 159 acres, which lies in Section 18 and is devoted to general farming and stock raising. He was born on a farm in Seneca County, O., September 18, 1841, and is a son of Zacharias and Esther (Sowards) Insley. The father died at McComb, in 1891, and the mother in 1897.

Mr. Insley accompanied his father and family to Hancock County in 1870, the father purchasing 100 acres of the farm which now belongs to his son and continued to cultivate the land until he retired. For forty years Martin Insley has resided in Portage Township with the exception of two years which he spent in Wood County. He has always been engaged in farming and stock raising but has more or less turned his heavy responsibilities over to his son, Charles Insley, who capably continues his father's industries.

In 1873, Mr. Insley was married to Miss Jane Montgomery, a daughter of George W. Montgomery, formerly a well known resident of the township and once postmaster at Portage Center. Nine children have been born to Mr. and Mrs. Insley, as follows: Ferdinand, who resides with his family in Portage Township; Charles, whose family includes twin sons, Blaine M. and Wayne A.; Nellie, who married Wesley Clark, of Portage Township, and they have three children, Ralph, Glen and Esther Mary; Lettie, who is the wife of Homer Brandebury; Bert, who married Freda Langhorst; Wilbur, who married Carrie Gorrell; Ola and Nola, twins; and Esther. Mr. Insley and family are members of the Portage Chapel Methodist Episcopal church, in which he is a trustee. In politics he is a Republican. At times he has served as a school director, the Archer school in District No. 3 being situated on his farm. He has resided on this place since 1896, coming here from another farm in Portage Township, situated two miles southeast of his present property.

WILLIAM G. HIRSCHER, proprietor of the Hirscher Cement Blocks Company, manufacturers of cement blocks and of ornamental cement work of all kinds, is one of Findlay's progressive business men and has been a resident of Findlay, O., all his life, born here September 18, 1874. His parents were Martin and Elizabeth (Enz) Hirscher.

Martin Hirscher and wife were both born in Germany. They were married at Bellefontaine, O., and in 1856 came to Findlay. He was a potter by trade and operated a pottery here and later acquired a stone quarry and while in the stone business began the manufacturing of cement blocks. He continued in this line until his death, which occurred in October, 1893. His widow continued the business until 1894, when William G. Hirscher took charge. He has been established in his present quarters since January, 1909. There is no doubt but that Mr. Hirscher is engaged in a business that seems to have a great future and there are those who predict that cement blocks will sometime supersede all other kinds of material for building purposes. At present he finds it necessary to have the help of three first class workmen, and he has completed a number of important contracts.

Mr. Hirscher married Miss Louisa Wagner, who was born at Findlay and is a daughter of Ludwig Wagner, and they have two children: Catherine and Helen. Mr. Hirscher is a member of the order of Odd Fellows.

J. H. VARNUM, M. D., a leading physician and surgeon in Hancock County, O., who has a well established practice at Benton Ridge, was born at Butler, Butler County, Pa., March 10, 1869, and is a son of E. L. and Elvina (McJunkin) Varnum, both of whom are deceased.

Dr. Varnum attended the public schools and later an academy at Prospect, Pa., after which he read medicine with a local practitioner and then entered the Medical Department of the Western Reserve University, Cleveland, O. He located first at Belmore, in Putnam County, but two years later came to Benton Ridge and has remained here ever since, identifying himself with the various interests of the place and yearly adding both personal and professional friends to his circle of acquaintance.

In 1893, Dr. Varnum was married to Miss Lulu M. Cherry, a daughter of Robert N. Cherry, of Benton Ridge, and they have one son, Robert O. Dr. and Mrs. Varnum attend the Methodist Episcopal church. In politics he is a Republican but his interest in public matters is merely that of good citizenship. He belongs to the Hancock County, the Ohio State and the American Medical Associations.

P. J. GRESSLY, whose finely improved farm of 280 acres lies in Sections 5 and 6, Union Township, Hancock County, O., is a native of Union Township, born in 1879, and is a son of Jacob and Martha I. (West) Gressly.

Jacob Gressly was born in Pickaway County, O., and was only four years old when he accompanied his parents to Hancock County and they were pioneers in Union Township, settling on a farm just south of the one above mentioned. Grandfather Henry Gressly died in Hancock County. Jacob Gressly followed farming all his active life, becoming one of the largest land owners in Hancock County. His standing as a citizen was high and he served as trustee of Union Township. He died at Findlay, O., August 25, 1909, at the age of sixty-five years. He married Martha I. West, who was born in Hancock County in 1845, a daughter of John and Catherine West. She resides in Union Township.

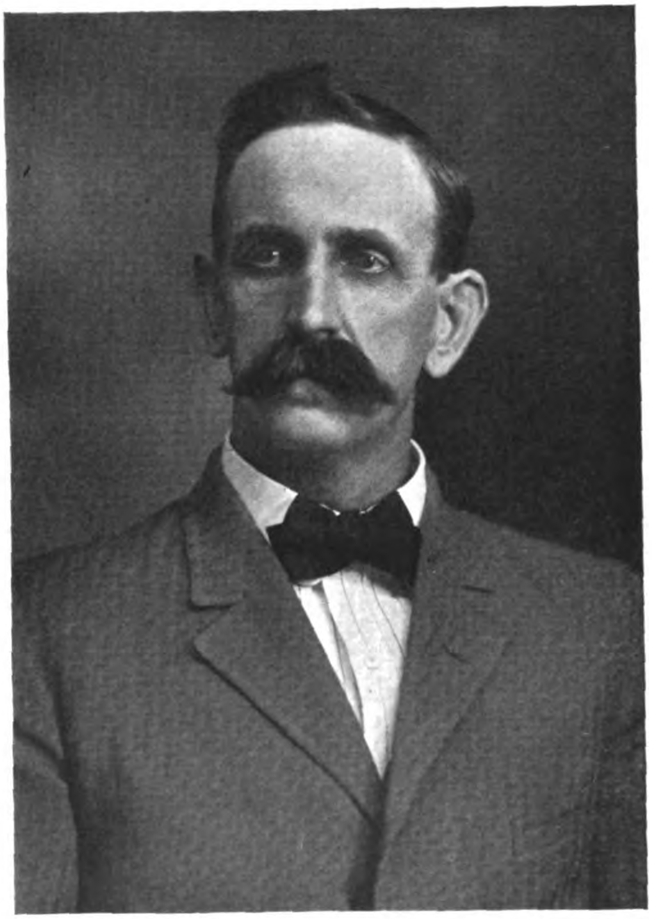
P. J. Gressly attended the country schools through boyhood and ever since has been interested in farm pursuits and is numbered with the most progressive and enterprising agriculturists of Union Township. His crops and cattle, together with his buildings and general surroundings indicate thrift, care and prosperity. In 1908 he erected a barn which is fitted up with all modern improvements, one of the best in the township.

Mr. Gressly was married October 21, 1903, to Miss Grace Baldwin, who was born, reared and educated in Blanchard Township, Hancock County, and is a daughter of Allen and Mary Ann Baldwin, the former of whom died May 9, 1893. Mrs. Baldwin survives and resides at Benton Ridge, O. Mr. and Mrs. Gressly are members of the Church of God, in Union Township, and he is superintendent of the Sunday-school.

DANIEL SHOOP, one of the representative citizens of Pleasant Township, Hancock County, O., owns 104 acres of valuable land, on which he carries on general farming. He was born in Lancaster County, Pa., November 12, 1840, and is a son of Jonas and Nancy (Goss) Shoop.

The parents of Mr. Shoop moved to Hancock County in 1842 and settled in Portage Township where the father purchased a farm of forty acres. There both parents died, the father being aged seventy-three years and the mother seventy-one years. There were five children, Daniel being the youngest born. The others were: Joseph, who went to California during the gold excitement and died there; Elizabeth, deceased, who was the wife of Charles Deitzman, lived in Michigan where both died; Annie, who married Henry Miller, is deceased, as is also her husband; and Jonas, who died in 1865, while serving in the Civil War. He went out from Portage Township and never married.

Daniel Shoop grew to manhood in Portage Township and worked for his father on the farm until he was master of his own time. He learned the carpenter trade and worked at the same for eighteen years. His instructor was Jacob Slupe, a well known citizen of this county. Mr. Shoop assisted in the building of houses and barns all through this section and worked when the lumber was all dressed by hand. There are a number of residences standing in McComb that Mr. Shoop helped to lay out, build and superintend and their stability proves his skill and honest work. As he acquired capital, for Mr. Shoop is a self made man and has earned every dollar he owns by his individual effort, he invested in land, his first purchase being forty acres in Portage Township which he sold when he moved to his present farm in Pleasant Township, in 1901. He has all but six acres under cultivation. When he first came here he began to drain his



CHARLES H. SHULER

land as had the older settlers, with pole and timber drains, but was one of the first to put down tile in the county. He can remember when the landscape presented a very different appearance than at present and when he was a boy heavy timber covered the greater part of the county and so much of it was under water that the name of the Black Swamp was given to miles and miles of what is now the most fertile land in this whole section. He has lived in Hancock County for sixty-eight years and enjoys the reputation of being one of its best and most reliable citizens. In all his business dealings he has been honest and straightforward and on any question there is never any doubt where he stands. This sincerity has brought him the confidence of his fellow citizens.

In 1868, Mr. Shoop was married to Miss Emma Miller, of Portage Township and two children were born to them: Joseph Edwin and Martha. Joseph Edwin resides in Portage Township. He married Millie Shanninghouse and they have five children: William, Dorothy,. Harry, Lois and Clara. Martha is the wife of Aaron Collingwood, of Liberty Township, and they have one living child, Harry Collingwood. Mr. Shoop's first wife died April 29, 1887. In 1898 he was married to Miss Phebe Insley, a daughter of Zacharias Insley. They attend the Lutheran church.

CHARLES H. SHULER, a representative business man of McComb, O., where he has resided for the past twelve years, has large grain and elevator interests in Pleasant Township and as a business man is known all over Hancock County. He was born on West Crawford Street, Findlay, O., August 17, 1866, and is a son of Henry and Elizabeth (Cunningham) Shuler.

Henry Shuler was born in Westmoreland County, Pa., August 10, 1823, and died September 13, 1900. He came first to Hancock County in 1853. He was a miller by trade and for some years lived at different points beside Findlay, but later moved on the Judge Cary farm, near Findlay and in 1883 purchased eighty acres of it, then forty, and later another forty, making 160 acres in all, and resided continuously on it from 1884. The work of clearing, ditching and improving has been done by his sons, the land at the time of purchase being practically entirely unimproved, there being no fences on the land and no buildings with the exception of a small saw mill. Henry Shuler was twice married. His first wife was Margaret Funck, a daughter of Abraham Funck, and the following children were born to them: Josiah, who lives at Swanton, O.; Mary, who is the wife of Pulaski Harmon, lives in Putnam County; Sylvanus Webb, who lives at Findlay; Tillman Abraham, who is a miller, lives at Norwich, Kan.; Emeline, who is deceased, was the wife of Jasper Walters; and William Wood, who is an attorney at law and is also a successful business man, resides at Oklahoma City, Okla. The second marriage of Henry Shuler was to Elizabeth Cunningham, who was born in Pennsylvania, a daughter of William Cunningham. She is also deceased. The children of this marriage were as follows: Isaac T., who resides on the farm in Pleasant Township; Alice M., who is the wife of Benjamin Dice, of Pleasant Township; Charles Henry; John F., who is a farmer; Daniel C., who is in the grain business; Susan, who is the wife of Paul Vance, now of East Chicago, Ill., formerly of Toledo, O.; and Freddie, deceased, who was a twin brother of

Susan. The parents were members of the Church of God.

Charles H. Shuler attended the public schools of Findlay and started his business life as a worker in the oil fields. For the past eighteen years he has been in the grain business and has made a success of it. In the spring of 1903, he built his elevator on the Shuler farm and there handles about 125,000 bushels of grain annually. He is considered an exceptional business man.

On December 30, 1891, Mr. Shuler was married to Miss Delphia Strouse, a daughter of Peter Strouse, of Pleasant Township, and they have had six children: Harvey Earl, who is deceased; Ina Pearl, an attractive school girl of fifteen years; Arthur Dales, who is a bright youth of thirteen years; Nellie Ruth, who is aged eleven; Charles Ernest, who is eight years old; and Ralph Eugene, who has passed his sixth birthday. Educational and social advantages await them and they give promise of becoming worthy successors of their parents. In politics Mr. Shuler is a Republican as was his father. With his family he belongs to the Presbyterian church.

ALFRED W. BALSLEY, M. D., physician and surgeon, with offices in the Rawson Block on South Main Street, Findlay, O., has been established in practice here since 1899 and has been a resident of Hancock County since he was four years old. He was born at Fremont, O., November 14, 1872, and is a son of Alfred and Lucy (Wickham) Balsley.

For many years the father of Dr. Balsley was prominent in journalistic circles in Ohio and at one time conducted a number of newspapers in the smaller towns of this section of the state and was also identified with the Journal at Fremont as editor and proprietor. In 1880 he founded the Jeffersonian, which was the pioneer daily paper of Findlay. He was also a factor in Republican politics and under the administration of President Grant, served as postmaster at Plymouth, O. He located at Findlay in 1876 and his death occurred here in 1904. His widow survives.

Alfred W. Balsley was reared at Findlay and in 1892 he was graduated from the Findlay High School. His father owned a tract of twenty acres, one-half of which lay within the city limits and the other half outside, and during his youth he spent some of his time on the farm and also became well acquainted with the work in the printing office. In the meanwhile he was making preparations to enter medical college and in the fall of 1894 he became a student in the medical department of the University of Michigan at Ann Arbor, where he was graduated with the class of 1899, immediately afterward locating at Findlay. His early preceptor at Findlay was Dr. J. C. Tritch.

Dr. Balsley enjoys a generous amount of practice among people who have known him almost all his life and not only have confidence in him professionally but also esteem him personally. He resides on Balsley Avenue, the beautiful avenue having been named in honor of his father. He is a Knight of Pythias and a Mason, belongs to the Tribe of Ben Hur and also to the American Insurance Union and is examiner and cashier of the last named body. In politics he is a Republican and in 1902, under Governor Nash, he was elected county coroner of Hancok County and was elected to a second term. He keeps in close touch with all developments in medical science and is a member of the Hancock County, the Ohio State and the National Medical Societies.

On June 8, 1910, Dr. Balsley married Miss Gertrude E. Alge, a daughter of Mr. and Mrs. Chas. Alge, residents of Findlay.

LEMUEL C. ILER, a well known citizen of Marion Township, Hancock County, O., owning a valuable farm of 120 acres, situated in Section 28, devotes it largely to dairy purposes. Mr. Iler was born on this farm, September 19, 1872, and has practically spent all his life here. His parents were Jackson and Abigail T. (Hallowell) Iler.

Jackson Iler was also born on this farm, a son of Jacob and Mary (McClain) Iler, the former of whom was born in Pickaway County. Jacob Iler, father of Jacob, was the one who entered the land and it has never been out of the family name. Both Jacob Iler and his son Jacob died in the log cabin that was first built when the forest covered all this land. To Grandfather Jacob Iler the following children were born: Jackson, Jacob, Mary Ann, Susan, Catherine, Louisa and Lewis. Jackson Iler was also born in the old log house and his life was spent in the cultivation and improvement of this farm. He married Abigail T. Hallowell, a daughter of Charles and Mary Hallowell. His death occurred of paralysis when aged sixty-two years. They had two children: Lemuel Conrad and an infant.

Lemuel C. Iler was educated in the district schools and at Findlay College and then taught school for twelve years very successfully and during that time made many friends who have continued such to the present day. At the death of his father he came into possession of the farm which is now known as Brookdale, and since 1908 he has been in the dairy business, on a moderate scale and operates a milk route to Findlay.

On June 17, 1896, Mr. Iler was married to Miss Frances H. Roth, a daughter of Adam and Margaret (Rowe) Roth, and they have four children: Homer, Fred, Harry and Frank. Mr. and Mrs. Iler are members of the United Brethren church, of which he is a trustee and for seven years he has been superintendent of the Sunday-school. In politics he is a Republican and for four years has been township clerk. He is identified with the Odd Fellows and the Foresters, both at Findlay.

ELMER HILTY, county surveyor of Hancock County, O., and a graduated engineer, was elected to this important public office on the Democratic ticket and assumed the duties of the same on September 6, 1909. He was born in Orange Township, Hancock County, O., March 16, 1880, and is a son of John and Mary (Thut) Hilty, who still reside in Orange Township.

Elmer Hilty was reared on the home place and attended the country schools. Finding himself ambitious for another career than that of farmer, he set about preparing for securing a technical education. After teaching school for six years he entered the Ohio Northern University at Ada, and was graduated in the class of 1904, having given his attention to the scientific and engineering courses. In the same year he was appointed deputy county surveyor and served as such until 1906, under County Surveyor Bolton, and from then until 1909 he was engaged in railroad work. His ability is recognized and seemingly his future professional success is assured.

Mr. Hilty married Miss Gertrude Linn, a daughter of Henry Linn and they have one child, Mary Catherine.

WESLEY CLARK, who resides upon his valuable farm of eighty-seven and one-half acres of land situated in Section 19 and 30, Portage Township, Hancock County, O., was born on a farm in Liberty Township, November 27, 1873, and is a son of Charles and Rosa (Hart) Clark.

Charles Clark was brought to Liberty Township, Hancock County, in boyhood. His father was Daniel Clark, one of the early settlers. Charles Clark and wife reside in Liberty Township, where he owns two valuable farms, and owns also a farm in Pleasant Township and still another large farm which is situated in Putnam County. He married a sister of John and Isaac Hart, both of whom are leading men of this section.

Wesley Clark was reared in Liberty Township and, with the exception of three years during which he worked in the oil fields, he has always been a farmer. He came to his present farm in April, 1898, and immediately began to make improvements which include the building of a barn and other structures and the rebuilding of the farm-house. He carries on a general farming line and is one of the representative agriculturists of the township.

Mr. Clark was married March 17, 1898, to Miss Nellie Insley, a daughter of Martin Insley, and they have three children: Ralph, Glen and Esther May. Mr. Clark is a member of the order of Maccabees at McComb.

SAMUEL S. PLETCHER, who is engaged in agricultural pursuits on a farm of eighty acres, located in Section 5, Allen Township, has been a resident of this neighborhood since the fall of 1900, and was born January 26, 1855, on a farm in Bloom Township, Wood County, O., and is a son of Christopher and Margaret (Hunsicker) Pletcher.

Christopher Pletcher and wife were both born and reared in Pennsylvania, but were married in Wood County, O. He followed farming until the latter part of his life, and at the time of his death was engaged in running an ashery at Van Buren, O. His widow subsequently married John Fox, who for many years was janitor of the college at Findlay, O. She purchased a farm near North Baltimore. In 1905, when returning from the church at North Baltimore she was killed by a B. & O. train.

Samuel S. Pletcher was about twelve years old at the time of his father's death, after which he went to work for old Johnny Ho, who lived near the Ten Mile church in Pleasant Township. Three years later he went to work for Mrs. Hannah Kagy, with whom he remained about three years and then worked out by the month until the time of his marriage. He began housekeeping on the John Hudson farm in Allen Township and about eighteen months later purchased a house and lot in Van Buren, O., where he resided one year. He then sold his property and for two years rented and farmed the Trout farm, in Allen Township, after which he rented his mother's farm of ninety-six acres, which was located one mile south of McComb. Eighteen months later his mother sold the farm, and he rented his brother's farm, which was three miles east of Belmore, for two years. He bought a house and several acres of land at Republic, Seneca County, O., and after farming that one year or more, removed to Bairdstown, Wood County, where he ran a meat market for two years, when he disposed of it, and for eight years rented the Adams farm of 240 acres in Bloom Township, Wood County. In 1900 he located on his present farm, which he had bought the year before, and has since carried on general farming here. He has greatly improved the place, remodeled the house, done considerable tiling, and otherwise made his property more valuable.

In 1877, Mr. Pletcher was united in marriage with Emma J. Drew, a daughter of Horace Drew, who is a veteran of the Civil War, and resides with our subject. Four children were reared by Mr. and Mrs. Pletcher: Horace Franklin, who died in June, 1906, left a widow, Sadie (Barnd) Pletcher, and two children, May and Samuel, the latter of whom has been adopted by our subject and wife; Henry Irwin, a barber, of Van Buren, O., married Edith Hedge and has two children, Horessa and Emmeline Irvina; Callie, and Horessa. They belong to the United Brethren church of Van Buren.

COLLIN D. HAYWARD, dealer in lumber and coal, with business quarters on Crystal Street, Findlay, O., is a thoroughly representative citizen and is serving in his second term on the city council. He was born at Kellysville, Ashtabula County, O., in 1859, and is a son of Samuel Hayward.

The father of Mr. Hayward was born in St. Lawrence County, N. Y., in 1826. In manhood he located at Conneaut, Ashtabula County, O., where he engaged in the banking business and became a prominent figure in politics, serving in the state legislature. He died in 1885, at the age of fifty-nine years.

Collin D. Hayward was reared and educated at Conneaut. When twenty years of age he went to Chicago and for two years was with the great mercantile house of Marshall Field & Co. In 1885 he came to Findlay and has resided here ever since and has identified himself with the leading interests of this section. In addition to his lumber and coal enterprise he is vice president of the Buckeye Traction Ditcher Company, which is the largest independent manufacturing concern at Findlay, makers of the famous Buckeye Traction Ditcher, the demand for which is world-wide. At present his company gives employment to about 200 men and when contemplated additions to the plant are finished, there will be 400 men employed. It is in a very prosperous condition, its business outlook being favorable in every way.

Mr. Hayward was married in 1907 to Miss Clara M. Coburn, who was born at Bradford, Pa., but has been a resident of Findlay since 1890. Mr. and Mrs. Hayward have one child, Rachel. In politics he is a Republican and on that ticket was elected councilman-at-large and has been a useful and effective official. He is identified with the Elks.

REV. T. R. STEINER, one of Union Township's most esteemed citizens, is a minister in the Church of God and has been a member in the same since he was fourteen years of age. He resides on his valuable farm of 100 acres, which is situated in Section 7, Union Township, Hancock

County, O. He was born in Riley Township, Putnam County, O., December 1, 1858, and is a son of Rev. I. and Mary P. (Rothen) Steiner. The father was born in Wayne County, O., and was a preacher and farmer.

T. R. Steiner obtained his early education in the schools of Riley Township and later, between 1876 and 1882, attended at irregular intervals as his other duties permitted, the sessions of the Ada Normal School. He taught six winter terms of school in Riley Township and in Richland Township, in Allen County, and proved his ability as an instructor. He has always been interested in educational matters and in 1909 was elected president of the school board of Union Township. In 1907 he was ordained a minister in the Church of God, in which he had been an elder for many years, and he has charge of a congregation near Convoy, O. Following his marriage he settled on his present farm which lies three and one-half miles north and two and one-half miles west of Mt. Cory. This is a very valuable property, being improved in every way, excellent fencing, perfect tiling and modern attractive buildings. General farming is carried on and the place is well stocked.

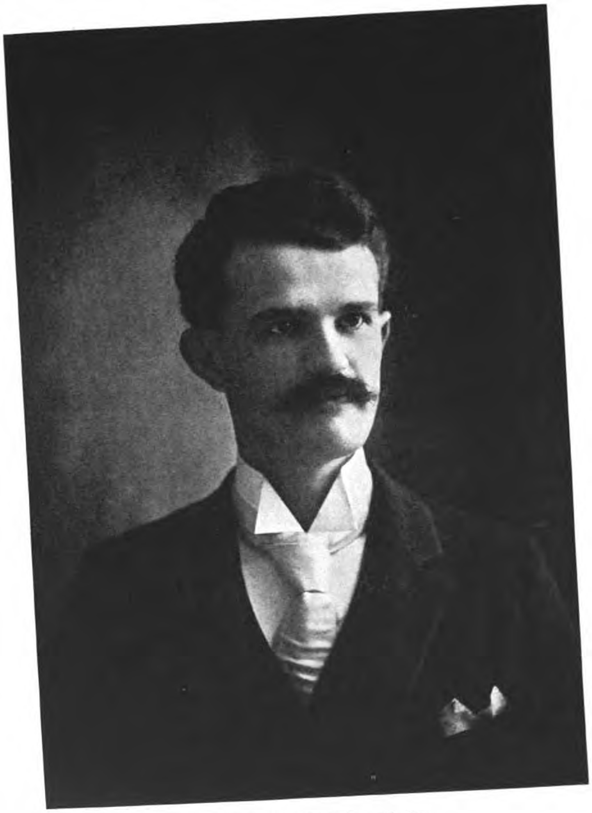
Mr. Steiner was married December 18, 1884, to Miss Mary S. Green, whose parents were well known people in this section. Five children make up the family, namely: Raymond W., who attended Findlay College for six years; Otto B., who attended the same institution for three years; and Lloyd G., Ralph and Herold, all living at home. Mr. Steiner has never taken an active part in politics but he is a good citizen and served very acceptably as township trustee from 1903 to 1905.

A. H. GOOD, general manager and half owner of the Risser & Good grain elevator, at Jenera, O., is also cashier of the Farmers' Bank Company and is one of the most enterprising business men of this thriving little city. He was born July 14, 1864, in Putnam County, O., and is a son of Ashford and Catherine (Dicus) Good, the former a native of Franklin County, O., and the latter of Champaign County. The father died when our subject was less than one year old and the mother resides on the old home farm in Putnam County, O. She is the mother of five children, all of whom are still living.

A. H. Good was reared and educated in Putnam County, and remained on the home farm until thirty years of age, then located ten miles west of Columbus Grove. In 1900 he came to Jenera, where he formed a partnership with Mr. Risser and purchased the present Risser & Good grain elevator, which they have operated continuously and successfully since that time. On November 11, 1902, he organized the Farmers' Bank, a private bank of Jenera, with four stockholders, and the following officers were elected: John Von Stein, president; John Heldman, first vice president; A. J. Grossman, second vice president, and A. H. Good, our subject, cashier. They erected the present bank building in 1905, and in January, 1909, incorporated as the Farmers' Bank Company with a capital stock of $25,000 with eleven stockholders, which have since been decreased to ten. Mr. Good, with three others, is also interested township

and half
elevator,
Farmers'
most en-
thriving
1864, in
Ashford
ormer a
the lat-
ner died
ear old
l home
is the
om are

ated in
home
ocated
. In
ned a
hased
ator.
and
mber
ank.
ock-
vere
ohn
oss-
ood.
the
nu-
rs'
of
ch
fr.
ed



J. W. H. BEACH, M. D.

in a Texas ranch and rice field of 1,240 acres. Mr. Good is a man of public spirit and enterprise and is recognized as one of the most progressive and substantial business men of Jenera, O.

Mr. Good was united in marriage with Miss Mary E. Brenner, who is a daughter of ex-Senator Simon Brenner, of Dayton, O. No children have been born to Mr. and Mrs. Good.

J. W. H. BEACH, M. D., who has been successfully engaged in the practice of medicine at Arlington, O., since April, 1898, was born in Crawford County, O., December 6, 1872, and is a son of Frederick and Martha (Feick) Beach.

Reinhart Beach, grandfather of Dr. Beach, was a native of Germany, and came to Crawford County, O., at an early period where he entered a tract of 160 acres of farm land from the Government in Vernon Township. There he spent the remainder of his life and died in 1885. Frederick Beach, father of subject, was born November 7, 1837, in Crawford County, O., where he has always lived and where he follows farming.

J. W. H. Beach was reared in Vernon Township, Crawford County, O., and after completing the elementary course in the common schools, attended the High School of Crestline, O., for three years. In 1891 and 1892 he took a general course of study in the Normal School at Crestline, and in 1895 entered the Medical College at Fort Wayne, Ind., now known as the Purdue University, and on March 14, 1898, received a diploma for the practice of medicine. Dr. Beach came to Arlington, O., on April 27, 1898, and has since been located here in the practice of his profession.

On April 25, 1900, Dr. Beach was joined in marriage with Miss Florence N. Reigle, who was born September 11, 1876, at Arlington, where she was reared, and is the youngest daughter of Mr. and Mrs. P. A. Reigle. Her father was one of the best known stock buyers in Northwestern Ohio and died at his home near Arlington at the age of seventy years, three months and twenty-three days. One child, who died at the age of ten days, was born to Dr. and Mrs. Beach. Dr. Beach is a member of the German Reform church, and Mrs. Beach holds membership with the Methodist Episcopal church of Arlington.

EPHRAIM M. WARFEL, proprietor of the jewelry store located at No. 208 South Main Street, Findlay, O., has been established in business in this city since 1894 and enjoys a liberal amount of patronage on account of the reliable goods he carries and his honorable methods of disposing of them. He was born in one of the small villages of Lancaster County, Pa., January 30, 1843, and is a son of Abraham M. and Fannie (Maynard) Warfel.

When six years old, the mother of Mr. Warfel died and he was reared under the care of a step-mother. She saw that he attended school during some years of boyhood and he continued to work on a farm until he was twenty-one years of age, when he learned the flour mill business. For three years he worked in a flour-mill in his native county and then was employed at Knoxville, Ill., working in a mill at first in which he later bought a half interest, this being called the City Mill. After a residence of eleven years at Knoxville he sold his interests and moved to Galesburg, Ill., and was employed three years in a mill at that point and then leased a mill at Rushville and worked there as a mechanical engineer, and came from there to Findlay and embarked in his present line of business.

Mr. Warfel was married (first) in Lancaster County, Pa., to Miss Eliza Dritch, who died in 1893. They had three children: Elmer E., who lives at Pasadena, Calif.; Lizzie, who is deceased, was the wife of Frank Black; and Harvey Clyde, who learned the watchmaking trade at Rushville and is associated with his father. Mr. Warfel was married (second) to Mrs. Elizabeth M. Knapp, a native of Vermont. She was the widow of Dr. Frank Knapp, formerly of Findlay. They are members of the First Methodist Episcopal church, and Mr. Warfel is a class leader and is also president of its board of trustees.

SAMUEL M. BIBLER, whose well improved farm of forty acres is situated in Pleasant Township, Hancock County, O., is a representative agriculturist of this section in which he has made his home for many years. He was born in Fairfield County, O.

The parents of Mr. Bibler were also natives of Fairfield County and the father died there. The mother died at the home of her son Samuel B., in June, 1908, aged eighty-four years. They had five children to die in infancy and those who survive are: William, who lives in Pleasant Township, northwest of McComb; Frank, who is a farmer in Jackson Township; Clinton, who is a resident of Findlay; Etta, who is the wife of John Wright, of Fairfield County; and Samuel M.

Samuel M. Bibler came to Hancock County in 1875 and his first employer was Charles Thomas, whose farm was situated one and one-half miles east of Findlay, and with him he remained for eight months, then worked for the same period for Alfred Wilkes and for eighteen months for W. B. Miller. In 1884 he was married and for two years afterward lived on Mr. Miller's farm and operated it. In April, 1889, together with his father-in-law he purchased the John King farm and since April, 1890, has been located on his present farm in Pleasant Township. Here he replaced both the house and barn and has made many other improvements. General farming and moderate stock raising have been the industries which have claimed his attention for the past twenty-one years.

Mr. Bibler was married on November 13, 1884, to Miss Louie Baker, a daughter of Aaron Baker, of Findlay Township, Hancock County, and they have three daughters: Maud; Hazel, who is the wife of Cecil King, a resident of Pleasant Township and they have had two children—Dorothy Caroline and Lucile, the latter deceased; and Ethel, who is a school girl of twelve years. Mr. Bibler and family attend the Methodist Episcopal church at McComb. In politics he is nominally a Democrat but usually exercises his own good judgment in casting his vote, demanding that candidates shall be well qualified for the offices they seek and able to show an honorable past record.

JOHN HART, who is one of the three members making up that civic body, the Board of Review, of Findlay, O., came to this city from his farm, in the fall of 1894. He was born on a farm in Portage Township, Hancock County, O., in an old pioneer log house, March 7, 1843, and is a son of Abraham and Christina (Lynn) Hart.

Abraham Hart was born in Pennsylvania and his wife in Maryland. They were married in Ashland County, O., and in 1841 came to Hancock County and settled on a wilderness farm in Portage Township. He had to chop a clearing on which to erect his cabin but he lived to not only see his whole 160 acres cleared but also cultivated and improved. Abraham Hart was born June 8, 1815, and he died September 29, 1885, surviving his wife, who was born in 1809, for two years. They had a large family, six of whom reached maturity and four are yet living. Elizabeth became the wife of Abraham Bayles. She was born January 28, 1840, and died November 4, 1869. John was the second of the family. Isaac, who was born June 13, 1845, survives. Lucinda, who was born December 31, 1847, became the wife of Benjamin Huntwork, and after his death married John Dishong, who is also deceased. She died November 7, 1895. Rosanna, who was born December 15, 1850, became the wife of Charles Clark. Sarah Ann, who was a twin sister of Rosanna, became the wife of William Moorehead.

John Hart grew to manhood on the home farm and attended the country schools. The opening of the Civil War found him ready to offer his services but he was not able to arrange to go before August, 1862, being not quite nineteen years of age, when he enlisted in Co. F, 21st O. Vol. Inf., his first period covering one year. In April, 1864, he enlisted again, entering Co. G, 133rd O. Vol. Inf., and served 100 days. Mr. Hart was fortunate enough to escape all injuries, although often in danger, and returned home safely.

On October 1, 1868, Mr. Hart was married to Miss Eliza J. Taylor, a daughter of Washington Taylor, of Hancock County, and they have three children: Charles Austin, who is married and lives at Findlay; and Violet Olive and Eva Belle.

Immediately after marriage, Mr. and Mrs. Hart moved to his farm in Liberty Township and went to housekeeping in a log house, which, in the course of time gave way to a commodious brick residence, two stories in height, the building of which cost Mr. Hart $4,000. He made many other fine improvements, put the entire eighty-four acres under a fine state of cultivation and there carried on farming and sheep raising. He still owns the farm and has fourteen light-producing oil wells on the property. With his wife he owns the handsome family residence at No. 506 North Main Street, Findlay, together with a house and lot on North Cory Street. Both in Liberty Township and in Findlay he has been an active and useful citizen. In the former he served twenty-one years as township trustee and resigned the office when he came to this city, where he has been a member of the city council and is serving in his second term on the Board of Review, his associates being P. B. Arnold and David L. Grable. He is one of the representative men of Hancock County.

E. W. BURKET, who is owner and proprietor of the largest grocery store at Rawson, O., where he is one of the leading and representative citizens, was born in Union Township, Hancock County, O., October 27, 1867, and is a son of Jacob and Elizabeth (Walter) Burket.

Jacob Burket was also born in Union Township and now lives retired at Rawson. He was engaged in agricultural pursuits during the entire period of active life. He married Elizabeth Walter, who was born in Blanchard

Township and has spent her whole life in Hancock County.

E. W. Burket was mainly educated in the Rawson schools and from being a pupil he became a teacher and a very acceptable one. He taught four terms at Seton, Ill., and one term in District No. 1, in Union Township, Hancock County. In the fall of 1891 he started into business at Rawson, invested largely in property and became an active and enterprising citizen. He is a Democrat in politics and in 1906 was elected mayor of the town and was reelected in 1908. In 1898 he was elected a justice of the peace and for the past ten years has been a notary public. Mr. Burket has carried on his business at Rawson for the past nineteen years. He owns one of the largest business blocks in the town, the property which he occupies himself and also seventeen acres of land lying on the corporation lines of Rawson. In addition to dealing in groceries, he handles hardware.

On January 21, 1891, Mr. Burket was married to Miss Alpha M. Werts, of Sunbeam, Ill., a daughter of George W. and Mary (Decker) Werts, natives of Zanesville, O. The mother of Mrs. Burket died at Aledo, Ill., in February, 1906, and the father still resides at Aledo. Mr. and Mrs. Burket have three children: Firm C., Ruth M., and Leslie V. Mr. Burket and family belong to the United Brethren church at Rawson, with which he has been identified for ten years. For twenty years he has belonged to Lodge No. 410, Knights of Pythias at Rawson, in which he has filled every office.

CHARLES KILGOUR, chief engineer of the Toledo, Bowling Green & Southern Traction Company, who also operate the street railway system of Findlay and the Findlay-Mortimer Line, has been identified with this concern since 1905 and has been a resident of Findlay since that date.

Charles Kilgour was born in Cincinnati, O., and obtained his education in the schools of that city and in eastern institutions. Mr. Kilgour is a practical electrician and has been associated with various traction and electric light concerns since 1889, commencing his career in that line of business with the old Thompson-Houston Company of Lynn, Mass. This company later consolidated with the Edison Company, the consolidated firm being known as the General Electric Company of Schenectady, N. Y., with whom our subject was later employed on the road, installing machines in various parts of the country. Mr. Kilgour came to Findlay in 1905 and since that time has had charge of the engineering department of the Toledo, Bowling Green and Southern Traction Company, whose main offices are located in Cincinnati, O. Besides their other railway interests the company also operate the electric light plant and hot water heating systems of Findlay.

Mr. Kilgour was united in marriage with Miss Lucile Dolly. He is fraternally a Mason and a member of the B. P. O. E.

JOHN WORTMAN, one of the best known and most respected citizens of Blanchard Township, Hancock County, O., who, in association with his son, E. C. Wortman, is equal owner of a farm of 160 acres, was born September 10, 1825, in Lawrence County, Pa. Mr. Wortman came to Hancock County, O., in 1857 and settled in Blanchard Township on the farm on which he now lives. When he purchased his land it was almost a wilderness and it required many years of diligent attention and hard work to clear and improve it.

He has been satisfied to devote it to general farming and stock raising and has never made any tests for oil or gas. He still has thirty acres in timber.

Mr. Wortman was married in Pennsylvania to Miss Julia Dilworth, a daughter of Robert and Katherine Dilworth, of Lawrence County, Pa. She died in 1896 and her burial was at McComb, O. She was a most estimable lady, a consistent member of the Presbyterian church, a good neighbor and a faithful and tender wife and mother. She has one surviving sister, Miss Angie E. Dilworth, who taught twenty-five terms of school in Hancock County and is very highly thought of. To Mr. and Mrs. Wortman three children were born: Mary Ellen, E. C., and Florence E. Mary Ellen died at the age of sixteen years. E. C., who is half owner of the home farm, is a prominent citizen of the township of which he has served as supervisor. He devotes himself to farm pursuits and taught school for four winters in Blanchard Township. He is a stockholder in the Farmers' Mutual Telephone Company of McComb. He is unmarried. Florence E. married M. J. Fenstermaker and they live in Putnam County, and have one child, Hazel Glenn.

John Wortman has been identified with the Republican party since its formation and in earlier years took an active part in public affairs. In 1880 he was elected land appraiser of the township, served several terms as township trustee and also as justice of the peace. He has contributed liberally to the support of the Presbyterian church at McComb, in which he is an elder.

GEORGE J. HORN, architect and builder, who has been engaged in business at Findlay, O., since 1885, has been a resident of Hancock County during his entire life. He was born on a farm in Cass Township, March 4, 1859, and is a son of John B. Horn.

John B. Horn was born in Germany, a son of Dr. John Jacob Horn, who was a very prominent physician at Findlay. John B. Horn was seven years old when his parents came to America and to Findlay in 1848. He was a farmer in Cass Township until 1860, when he moved to Findlay, where he was a carpenter and contractor.

George J. Horn attended the old Union school on Sandusky Street, Findlay, and, as a boy, showed remarkable talent for drawing and took more interest in designing than in any other study. He made his own drawing board, triangle and T-square and during the time he worked as a carpenter, displayed unsual exactitude in his measurements, these details coming to him naturally and easily. It has always been a matter of personal regret with Mr. Horn that at the beginning of his work as an architect he could not see his way clear to attend any technical school, but there are many in the profession at Findlay who did enjoy such advantages, who gladly avail themselves of Mr. Horn's natural talents when they have a difficult piece of work. He started out as an architect, with his self-acquired knowledge, in 1885, just in time to take advantage of the business "boom" that visited Findlay and continued through 1887, 1888, 1889 and 1890. During 1887 he designed and built over twenty business blocks in the city of Findlay alone. Subsequent years have also been busy ones and want of space makes it impossible to call attention to all of the fine work done by Mr. Horn, but these notable examples may be given: T. B. G. & S. T. Co. Power Station, General Offices and Car Barns; D. Kirk & Sons Co., wholesale grocery house; Rawson Block, in which Mr. Horn has his offices; Gray & Patterson Block; First National Bank (rebuilt); Fair Company Grand Stand and Training Stables; Buckeye National Bank (rebuilt); Electric Construction & Motor Co. Garage; and the rebuilding of the handsome residences of J. C. Donnell and William M. Tait. Mr. Horn combines architectural beauty with solid and practical construction in a way that is admirable from every standpoint.

Mr. Horn was married to Miss Etta B. Dickson, of Kenton, O., who died May 25, 1909, leaving one daughter, Georgetta, who resides with her father.

Mr. Horn has always been an active and interested citizen. In 1908 he was made a member of the Board of Public Service at Findlay and served two years. During this time, in a public spirited way, he endeavored to interest his fellow citizens in the project of appropriating a certain sum of money to be used for the erection of a memorial building to mark the site of old Fort Findlay, around which so much of the early history of the city centers. With this idea in view, he prepared a beautiful design, which, if eventually accepted, will be not only creditable to the city but will be but another proof of Mr. Horn's artistic skill. Mr. Horn is identified with the Knights of Pythias and the Elks.

EDWIN RUTHVEN HAY, who owns a valuable farm of 159 acres, situated in Section 30, Marion Township, Hancock County, O., is one of the leading and substantial citizens of this county and one of the largest tax payers of the township. He was born in the old log house then standing on his father's farm in Fairfield County, O., March 13, 1831, and is a son of Peter and Christina (Platter) Hay.

Peter Hay was born in Berks County, Pa., the youngest son of Adam and Mary Hay, who were natives of Germany, and died in Fairfield County. There Peter grew to manhood and died on the old home farm October 28, 1852, having purchased the interests of all the other heirs. He followed farming and stock raising. He married Christiana Platter, who was born at Maysville, Ky., a daughter of Peter and Sarah (Crabbs) Platter, who came from Germany. She survived her husband several years, dying in June, 1858, aged sixty-one years. Ten children were born to Peter Hay and his wife, namely: Joseph and Jonathan, both of whom are deceased; Margaret, who was the wife of N. Schley, both now deceased; Peter, who is deceased; Edwin Ruthven; Edward, who is deceased; Sarah, deceased, who was the wife of Daniel Schley; Zelda Ann, who died young; Meander, who resides in Fairfield County; and one that died in infancy.

Edwin R. Hay attended the district schools and also an academy at South Salem, in Ross County, after which he taught school for two winters in Fairfield County and proved very acceptable as a teacher. He followed farming in the summers up to 1862, when he enlisted for service in the Civil War then in progress, entering Co. C, 61st O. Vol. Inf., of which he was first sergeant-major and later second lieutenant, and held that rank in his company during the memorable second battle of Bull Run. After his military service was over he returned to Fairfield County and

MR. AND MRS. ERNEST E. URBAN

resumed farming and came from there to Hancock County in 1869.

On December 2, 1869, Mr. Hay was married to Miss Angelicie Frisbie, a daughter of Amos Frisbie. She died June 12, 1879, leaving two children, Abigail and Charles. Abigail married Dr. F. B. Entrikin, now deceased, a graduate of the Cincinnati Medical College and formerly a practitioner at Findlay. Two children survive him: Edwin Wayne and Lorain, both of whom live with Mr. Hay. Charles Hay lives also on the homestead and is his father's farmer. This place is the old Frisbie farm and the improvements which Mr. Hay has put here have made it one of the most valuable in the township. The residence is a handsome ten-room structure and it is surrounded by beautiful grounds which make it attractive. Mr. Hay has never cared for political office but he has always been an interested citizen and casts his vote with the Democratic party.

ERNEST E. URBAN, owner of 322 acres of rich farm land, situated in Union Township, Hancock County, O., has resided for twenty years on his farm of 122 acres located in Section 35, 160 acres being in Section 26, while in Section 34 lie the other forty acres. He was born in Findlay Township, Hancock County, October 10, 1854, and is a son of Andrew and Barbara (Haines) Urban.

The parents of Mr. Urban were born in Saxony, Germany, and they came to America and settled in Findlay Township, Hancock County, O., in 1838, where the mother died in 1883 and the father in 1887. He was a successful farmer and a respected citizen.

Ernest E. Urban was reared in Marion Township and obtained his schooling there. After he married he and his wife resided in Union Township for five years, then one year in Eagle Township, coming from there to the farm on which he lives, which lies four miles south of Rawson, on the Ridge road. He has made notable improvements here in the way of clearing, tiling and fencing, and has remodeled both house and barn. Everything is substantially built and thrift and good management are shown in all directions. He does general farming and raises cattle, sheep and hogs and in addition he has twenty-eight producing oil wells.

Mr. Urban is a man of independent means and he is also one of the representative citizens in all that pertains to the advancement of his township along practical lines.

On January 1, 1884, Mr. Urban was married to Miss Polena Schondlemyer, who was born in Marion Township and reared in Cass Township, Hancock County. Her parents were natives of Germany. Seven children have been born to Mr. and Mrs. Urban: Cleveland C., Lawrence, Oran J., Ray G., Zoa M., Era E. and Andrew O. Lawrence married Miss Elsie Solt, of Eagle Township. Mr. Urban and family are members of the Evangelical church at Canonsburg, in which he has been a steward for sixteen years and a trustee of the township cemetery from 1907 to 1910.

LAWRENCE J. CRAWFORD, a well known building contractor of Van Buren, Hancock County, O., and the owner of 160 acres of farm land in Allen Township, has been engaged in the contracting business since seventeen years of age. He was born September 9, 1858, on a farm in Eagle Township and is a son of George W. and

Eliza (Smith) Crawford. His parents were both natives of Pennsylvania, who, after their marriage located in Richland County, O. The maternal grandfather was a man of prominence and wealth and spent his entire life in Pennsylvania. He gave a farm to each of his children, and upon the parents of our subject locating in Hancock County, gave them a tract of eighty acres in Eagle Township. This they sold in 1869 and purchased a tract of eighty acres in Allen Township about one mile west of Mortimer. Mrs. Crawford died in 1865, while the family still lived in Eagle Township, and in 1870, Mr. Crawford married Parmelia Sipes. In 1879 Mr. Crawford removed from the farm to Mortimer, O., where he died December 19, 1907.

Lawrence J. Crawford obtained his educational training in the district schools of Eagle and Allen Townships, and early in life began learning the carpenter's trade with George Mellott, in whose employ he continued four years. In 1876 he established a business for himself, and has been engaged continuously and successfully in general contracting since that time. He has erected many of the barns, residences and public buildings of Allen and surrounding townships, and also built many of the finest buildings of Van Buren, O. Some of the buildings erected by Mr. Crawford are: the Presbyterian church of Liberty Township, the Hagerty School of Liberty Township, the school of District No. 9 of Allen Township, and others too numerous to mention. Mr. Crawford also retains an interest in the old home farm in Allen Township, and in 1886 bought eighty acres of land two miles west of Van Buren, and ten years later bought an adjoining eighty acres.

Mr. Crawford served one term as township trustee of Allen Township, and was a candidate for county commissioner on the Democratic ticket in the fall of 1907, but was defeated. He is a member and elder of the Presbyterian church, of which he is clerk of the session.

Mr. Crawford was married to Anna Kuhlemeier, who was born in Toledo, O., and is a daughter of Frederick and Matilda Kuhlemeier, both natives of Denmark. Six children have been born to Mr. and Mrs. Crawford: Howard, who is taking a course in music at the University of Wooster; Harold D.; L. Everett; Donald, and two who died in infancy.

JENS J. WAALAND, florist, with greenhouses and office at No. 123 East Front Street, Findlay, O., has been established in business in this city since October, 1905. He was born at Stavenger, Norway, April 27, 1866, and is a son of Lars L. and Helen (Ueland) Waaland. The father still follows farming and conducts a dairy, in his native land.

Jens J. Waaland was twenty-four years of age when he came to America, in 1890. He found his first greenhouse work at Toledo, O., and from there went to New York State and from there to Boston, Mass., working as a florist at each place he stopped, and then returned to Toledo and from there went to Fostoria, where he bought out two separate firms and continued in business for ten years, when he came to Findlay. He has first class quarters and all modern equipments including a fine hot water system. He has six different glass covered rooms affording him 10,000 square feet of glass. Mr. Waaland does a very large retail business, deals in cut flowers suitable for every occasion and makes a specialty of funeral designs. He started into this business in Norway, in 1881, and has devoted himself to it ever since, succeeding not only on account of his knowledge and skill but because of his natural liking for it.

At Toledo, O., Mr. Waaland was married (first) to Miss Grace Mabel Errett, of Boston, Mass., who died at Findlay, Dec. 1, 1908. They had five children born to them: Harold, Norman, Erven, Robert and Walter. Mr. Waaland was married (second) to a widow, Mrs. Frederica (Gjesdal) Strand. Mr. Waaland is a member of a number of fraternal organizations, including the Knights of Pythias, the Maccabees, the Modern Woodmen, the Tribe of Ben Hur and the Turners. He is a highly respected citizen and prosperous business man.

JOSEPH EDWARD SHOOP, who resides on his valuable farm of 160 acres situated in Section 29, Portage Township, Hancock County, O., is one of the leading men of his neighborhood and is active in its public affairs. He was born on the William Brickman farm, in this township, January 1, 1871, and is a son of Daniel and Sarah E. (Miller) Shoop.

Daniel Shoop was born in Philadelphia and was a son of Joseph Shoop, who came to Portage Township in 1841, Daniel then being two years of age. Joseph Shoop entered, cleared and later improved the farm on which his grandson, Joseph E. Shoop, later was born, and continued to live there until his death. Daniel Shoop still lives and resides in Pleasant Township. He married Sarah E. Miller, who died in 1885. Her father was John S. Miller, of Hancock County.

Joseph Edward Shoop was reared in Portage Township and attended school during the usual boyhood term and then learned the carpenter trade. He has always been a busy, hard working man, working for three years as a carpenter and then laboring for seven years in the oil fields. Since then he has given his whole attention to farm work and has lived on different properties in the township, renting the McEnnally farm for seven years before he bought a farm of ninety-eight acres directly across from his present one, selling that place when he bought the 160 acres on which he lives, which was formerly known as the old Crumrine place. Here he carries on general farming and raises some excellent stock and is considered one of the representative successful agriculturists of this section.

Mr. Shoop married Miss Amelia Jane Sharninghouse, a daughter of William Sharninghouse, and they have five children: William Ray, Dorothy E., Clarence D., Trois May and Joseph Edward, Jr. Mr. Shoop and family are members of the German Lutheran church at McComb. He belongs to the fraternal order of Modern Woodmen of America. He is an intelligent, reliable and honest man and his fellow citizens make no msitake when they elect him to public office. At present he is serving in the office of land appraiser and for four consecutive years he was personal tax assessor.

W. S. VAN HORN, M. D., physician and surgeon, with well appointed office at No. 510½ South Main street, Findlay, O., has been established in this city since 1888 and comands a large and lucrative practice. Dr. Van Horn was born on a farm in Amanda Township, Hancock County, O., three miles west of Vanlue, June 13, 1853, and is a son of James Moore and Mary Magdalene (Morehart) Van Horn.

James Moore Van Horn was a native of Bucks County, Pa., a representative of an old Dutch family that came to America from Holland in the 16th century. The founder of the family in Hancock County was the grandfather of Dr. Van Horn, Charles Van Horn, who came in 1832, when his son, James Moore, was six years old. He settled in Amanda Township and subsequently gave his name to the Van Horn church and cemetery, old landmarks there. James Moore Van Horn married a daughter of David Morehart, a native of Fairfield County, O., who was brought to Hancock County in her girlhood. Ten children were born to them, five sons and five daughters. The mother of this family died in 1901 and the father in 1903.

W. S. Van Horn remained on the home farm until he was twenty-seven years of age, in the meantime farming and teaching school alternately for six years. There were other sons, however, to carry on the farm and as his tastes lay in another direction, he began the study of medicine under Dr. J. A. Grove, at Mt. Blanchard and later attended the Eclectic Medical Institute at Cincinnati, O., where he was graduated in 1883. For five years he engaged in practice at Mt. Blanchard and then came to Findlay where he has continued to be actively engaged for the past twenty-two years. He is a member of the National, Ohio State and Northwestern Ohio Eclectic Medical Associations.

Dr. Van Horn married Miss Agnes Allison, of York County, Pa., and they have had four children: Nellie G., who is a graduate of the Eclectic Medical Institute of Cincinnati, is the wife of Dr. Bradstreet, a physician of Rochester, N. Y.; Allison Moore, who is a practicing physician at Findlay, occupying the same suite of offices as his father, is a graduate of the Eclectic Medical Institute at Cincinnati, married Gail Swartz and has two sons, Winfield S. and Bert; and Edna and Edith, twins, the latter of whom died when aged five years.

JOHN M. CRIST, who resides on a farm of 160 acres, which is owned by his father, situated in Eagle Township, seven miles south of Findlay, O., on the Washington road, and four miles east of Rawson, on the Rawson road, has lived here all his life, his birth having taken place December 3, 1871. His parents are E. E. and Rebecca (Friend) Crist.

E. E. Crist, who lives retired at Rawson, O., was born in 1842 on the farm in Eagle Township on which his son lives and on which his father, Simon Crist, settled about 1837 as a pioneer in this section. J. M. Crist, father of Simon, entered the land from the Government, securing it for $1.25 per acre, and he followed an agricultural life. E. E. Crist paid more attention to stock buying and as he was successful in that line found it to his advantage to hire workers on the farm. In 1890 he retired to his present home at Rawson. He married Rebecca Friend, who was born in Indiana and died at Rawson, December 28, 1904.

John M. Crist obtained his education in the country schools. In the fall of 1895 he was married and started to housekeeping at Rawson but moved from there to the homestead soon afterward and since 1897 has rented the farm from his father and has carried on farming and stock raising very successfully, having many increases yearly to his herds and flocks. Since taking possession, Mr. Crist has put his heart into the work of improvement and has built a fine residence and substantial barn and has done a great deal of tiling. He has proved himself a capable, intelligent, wide awake, modern farmer.

To Mr. and Mrs. Crist six children have been born, namely: Nemo E., Waldo M., Harry E., Rema F., Leora M. and Howard Leroy. Mr. and Mrs. Crist are members of the Lutheran church in which both were reared by Christian parents.

AUGUSTUS M. SMITH, proprietor of the A. M. Smith Marble and Granite Works, at No. 132 West Crawford Street, Findlay, O., has been numbered with the representative business men of this city for over a quarter of a century. He was born at Cincinnati, O., July 19, 1854, and is a son of John and Sarah J. (Hopkins) Smith.

John Smith was born in Pennsylvania, in 1832, and died at St. Louis, Missouri, in 1855, having moved there from Dayton, O. He was a tailor by trade. He married Sarah J. Hopkins, who survived him, and they had two children: Augustus M. and Mrs. Fannie Price, the latter of whom died in 1895.

Augustus M. Smith was an infant when his parents moved to Dayton, O., and when about seven years of age he accompanied his widowed mother to Indianapolis, Ind., where they lived until 1869, when they moved to Cleveland, O. Before leaving Indianapolis, Mr. Smith had started to learn the stone cutter's trade and he completed his apprenticeship in Cleveland. In 1875 he came to Findlay and from July 1, 1875, until January 1, 1881, he had charge of the large marble works of Louthan & Son, leaving their employ to begin business for himself. Mr. Smith is one of the few practical marble and granite men who understand the business from one end to the other. He not only has learned all its mechanical details but thoroughly understands stone cutting, monument work, designing and mechanical drawing for monuments, mausoleums and every description of ornamental stone work. There are very few marble workers who are able to do their own designing or draw their own plans. He conducts the only stone yard at Findlay and gives steady employment all the year round to ten men. In addition to his stone work in regard to monuments, he does all kinds of stone contracting and a number of the leading buildings at Findlay have been erected with Mr. Smith as sub stone-contractor, and in this department he hires as many as forty men. Among the many buildings for which he has done the stone work may be mentioned: the Phoenix Inn; the stone block south of the Phoenix Inn; the Hyatt Block; the stone fronts on the Commercial Bank and Savings Company; the Buckeye National Bank and the City Banking Company. He has also done all the stone work on the Findlay Post Office; the Patterson and Gray Block and on innumerable private residences. He ships monuments to all parts of the country.

Mr. Smith married Miss Julia A. Myer, of Wapakoneta, O. The three children of the family are named: Frank E., Harry A. and Chester P. Mr. Smith is affiliated fraternally with the Elks, the Knights of Pythias, the Odd Fellows, the Tribe of Ben Hur and the Woodmen of the World.

W. H. WITTENMYER, a representative business man of Benton Ridge, O., dealing in lumber, coal, cement blocks and building supplies of all kinds, being a contractor also in the same, is also sole owner of a valuable saw mill at this place. Mr. Wittenmyer was born in Seneca County, O., May 26, 1855, and is a son of Henry and Charlotte Wittenmyer.

When he was six years old, the parents of Mr. Wittenmyer moved to Clearfield County, Pa., and there he attended school and remained until he was twenty-one years of age. In 1876 he returned to Seneca County and for one year worked for his uncle, near Flat Rock, and then came to Benton Ridge where he worked for one year as a farmer and carpenter. He then moved to Wood County, O., where he had charge of a shingle mill for three years and then traded for a saw mill at Hoytsville, which he operated for six years and then rented it to his father and moved to his father-in-law's farm and operated it for eighteen years. When the latter died he moved to Benton Ridge and since 1908 has been identified with his present line of business. The mill was first started by the firm of George & Son and when Mr. George's son retired, Mr. Wittenmyer bought his interest and on November 15, 1909, he bought out the other interests and has continued sole owner. Together with the mill he bought an acre of land. He has equipments in the mill for custom sawing of all descriptions and can turn out fine planing mill work. Mr. Wittenmyer is not only an active and enterprising business man but he is also a progressive and reliable citizen and his value as such to his community is fully acknowledged. From January, 1908, until January, 1910, he served as mayor of the town and is now clerk of the school board. He is very active in Democratic circles and is a member of the township Democratic Central Committee. He has additional business interests, being president of the Benton Ridge Mutual Telephone Company.

Mr. Wittenmyer was married to Miss Clarinda Sager, a daughter of the late Rev. Jonathan Sager, a minister of the Evangelical Association, and they have seven children: B. C., Bessie P., George O., James Merle, Ethel E., Wm. L., and Mary L. Mr. and Mrs. Wittenmyer are members of the Evangelical church, in which he is chorister and of which he is a trustee. He is identified with the Maccabees and the Junior Order of United American Workmen.

Mr. Wittenmyer resides on Main Street, in what is considered the finest residence in the town.

WILLIAM C. NUSSER, superintendent of one of Findlay's most important public utilities, the city water works, has been identified with the water works department since July, 1889, and for nine years has been superintendent. Mr. Nusser was born at Findlay, Ohio, November 7, 1866, and is a son of Godfrey and Rebecca (Burns) Nusser. The father of Mr. Nusser, now deceased, was formerly a well

JOHN D. THOMAS

known contractor. The mother is still living.

William C. Nusser was reared at Findlay and attended the public schools. He then went to work in the gas works in his native city and remained an employe for four years, coming then to the water works department, by which he was engaged as a lineman. He continued in that position until he was appointed superintendent in 1901. The old office was in the Jones Block, near the First National Bank but as soon as the new city building was completed, which was in 1903, the water works offices were installed there. Mr. Nusser has had additional public duties, having been street commissioner since February 1, 1908, to April 1, 1910. In whatever position he is found there will be seen an efficient man, one whose value to his native city has been thoroughly tested and proved.

Mr. Nusser was married to Miss Charlotte J. Jacobs, of Findlay, who is deceased. His second marriage was to Miss Bessie E. Roberts, a daughter of David J. Roberts, of Findlay. Mr. Nusser has five children: Roy C., a bookbinder, who married Gertrude Buckingham, and resides at Marion, Ohio; and Alfred G., Earl, Wilbur and Miles. Mr. Nusser is a member of the order of Ben Hur, of the Odd Fellows, Encampment branch of the Masons, and of the B. P. O. E.

JOHN D. THOMAS, funeral director, who is engaged in business at McComb, O., was born in Indiana, May 24, 1855, and is a son of Benjamin and Marilla (Westbrook) Thomas.

Benjamin Thomas and his wife were both born in Morrow County, O., where the Thomas family was established by the grandparents of John D. Thomas, many years ago. They were John D. and Lena Thomas and were natives of Wales. When they came to Morrow County the land was yet so much of a wilderness that they could only safely make their way through the forests by blazing the trees as they pushed through. Benjamin Thomas assisted his father in clearing the farm. He resides with his son, John D. Thomas, being now aged eighty-five years. His wife died over fifty years ago. Four sons were born to them: Wilbur, who is a farmer in Morrow County; Martin, who was a resident of Detroit, Mich., for a number of years; Elmer, who lives in Morrow County; and John D., of McComb.

John D. Thomas was born while his parents were making a short sojourn in Indiana, but he was reared and educated in Morrow County. In August, 1878, Mr. Thomas was married to Miss Alice Needles, who died in November, 1900. Her father was Levi Needles, of Morrow County. Mr. and Mrs. Thomas had two daughters: Cora and Elise, both of whom reside with their father.

Mr. Thomas came to McComb from Fredericktown, in April, 1908. He took his examination as an embalmer at Zanesville, O., and received his license in 1902. He has a finely equipped establishment and has so gained the confidence of the public that calls come for his services from all this section. Mr. Thomas is identified with a number of fraternal bodies, including the Knights of Pythias, the Odd Fellows, the Modern Woodmen and the Maccabees. He is a member of the Methodist Episcopal church. In politics he is a Republican.

J. N. LANNING, an enterprising farmer of Hancock County, residing on a farm of forty-eight acres located in Section 22, Marion Township, has been a life-long resident of this county and was born October 24, 1844, a son of Gershom and Sarah (Swab) Lanning.

This branch of the Lanning family was established in Hancock County, O., at an early period by Isaac Lanning, who came from New Jersey and settled on a small farm in Eagle Township. He was a shoemaker by trade, which he followed, while his sons operated the farm. He was the father of five children, all of whom are deceased, namely: David, Gershom, Hiram, James and Margaret. Gershom Lanning was born in Fairfield County, O., in 1813, and during early manhood came to Hancock County with his parents and here followed his trade as a blacksmith and worked out by the day. He served in the Civil War, enlisting in Co. G., 57th O. Vol. Inf., and died in 1863, while in service. He was four times married, his first wife and mother of our subject, was Sarah Swab, who died in 1849 aged thirty-two years. Of their union were born four children: James W., who served in the 57th Ohio Vol. Inf., and died in the army; John Nelson, our subject; Sarah S., who is the widow of Andrew Shafer; and William. His second union was with Mary Bercaugh, by whom he had one son, William T. His third union was with Mrs. Mary Fellers, which resulted in the birth of one son, Jacob H. He later married a Mrs. Harris.

John Nelson Lanning at an early age started out in life for himself. At the age of eleven years he went to live with John Croft of Eagle Township and made his home there until twenty-two years of age. He attended the district schools of the township, the Findlay High School, and later took a course at the Ohio State Normal at Ada. He then engaged in farming during the summer months and taught school in Hancock County for twelve winters. In 1882, two years after his marriage, he abandoned teaching and purchased his present farm from U. H. Grable, and has since devoted his entire time to general farming.

On April 11, 1880, Mr. Lanning was joined in marriage with Julia A. Smith, a daughter of Isaac and Mary B. Smith, both of whom are deceased. Mr. Lanning is a man of public spirit and always takes an active interest in affairs pertaining to the welfare of the community in which he lives. He is a Democrat.

HON. S. E. LOWE, mayor of Mt. Blanchard, O., and the owner of a valuable farm of 160 acres in Jackson Township, Hancock County, O., was born and reared in Jackson Township, his birth taking place on October 18, 1851. His parents were William and Sarah (Hendrick) Lowe.

William Lowe was born in York County, Pa., and from there came to Hancock County and settled on a farm in Jackson Township in 1840. He was a man of local importance for a number of years, being enterprising and useful in his neighborhood. He followed farming.

S. E. Lowe was reared on the home farm and obtained a country school training in boyhood, after which he followed agricultural pursuits until 1900, when he moved to Mt. Blanchard. He has been an active and interested citizen and served two years on the town council before he was first elected mayor, in 1907. His administration of this office received public endorsement by his reelection. In politics he is a Democrat but in the governing of the city, Mayor Lowe has shown favor only to those office-holders who have demonstrated their efficiency in public matters, irrespective of party.

Mr. Lowe was married the first time to Miss

Susan Foster, who was born and reared in Jackson Township, and died at Mt. Blanchard in 1904, at the age of fifty-two years. Three children were born to that marriage, namely: Wesley M., who died at the age of five months; Lelia L., who died aged five months and twenty-six days; and Grover, who died aged two months. Mr. Lowe was married the second time to Miss Alice Sockrider and they have one daughter, Frances N. Mayor and Mrs. Lowe are members of the Methodist Episcopal church. He is identified with Lodge No. 481, Knights of Pythias, and with Lodge No. 344 Odd Fellows, both at Mt. Blanchard, and is chaplain of the latter organization.

ULYSSES GRANT GEISEY, a well known hardware merchant and highly esteemed citizen of Van Buren, has been constable of Allen Township for about twelve years and a resident of Hancock County since 1893. He was born April 4, 1869, in Westmoreland County, Pa., and is a son of John and Lydia (Garvin) Geisey, the former of whom was a bridge builder by trade and a veteran of the Civil War. John Geisey died December 21, 1907, at the age of seventy-two years, the cause of death being heart failure. His wife died August 4, 1907, of paralysis. They were married in 1858 and had twelve children, namely: "Bub," who is deceased; George Hamilton, Mrs. Ellen Lewis, Mrs. Harriet M. Wilson, Ulysses Grant, Harry, Luther H., Mrs. Molly M. Knox, Mrs. Martha J. Glasser, Mrs. Nellie V. Drum, Emma V. and A. Katherine. John Geisey had an enviable war record. He participated in thirty-two battles but was never wounded and never in the hospital, though his period of service covered three and a half years. He was a member of Co. C, 84th Pa. Vol. Inf., which was organized in Harrisburg, Pa. Company C was organized by J. J. Wirsing and William Logan and was named the Foster Guards, after Hon. H. D. Foster. Among the battles referred to in which Mr. Geisey participated were the following: Fredericksburg, Winchester, Fort Royal, Fort Republic, Second Bull Run, Chancellorsville, Kelly's Ford, Mine Run, the Wilderness, Spottsylvania, North Anna, Tolopotomy, Cold Harbor, Petersburg, Strawberry Plains, Deep Bottom and Poplar Spring Church. The 84th was consolidated with the 57th Pa. Vols., both regiments being nearly annihilated before the close of the struggle.

Ulysses Grant Geisey spent his early boyhood days in Westmoreland County, Pa., and at the age of fourteen began learning the harness making trade at Greensburg, Pa., in which line of business he has been since engaged. In 1893 he came to Van Buren, O., and opened a harness shop, and since 1901 he has also dealt extensively in hardware, farming implements, drain tiles, etc., and commands a very large patronage throughout this section of the county.

Mr. Geisey was united in marriage with Nancy Lyon, a daughter of Lewis S. Lyon, and they have been the parents of four children —Lydia, Lewis, Marjory and John. In politics Mr. Geisey is a Democrat. He is affiliated fraternally with the Sons of Veterans at New Florence, Pa., also with the Maccabees and the Modern Woodmen of America at Van Buren.

CHARLES RIECK, interior decorator and contract painter, who is located at No. 522 South Main Street, Findlay, O., also deals in painters' supplies, wall paper, picture frames, etc., and is one of the foremost business men of the city. He was born November 7, 1864, in Germany, and is a son of Carl and Elesie Rieck, the latter of whom died in Germany, her native country. The father died in America, where he located some years after our subject came to this country.

Charles Rieck was reared and educated in his native country, where he learned painting and decorating. He came to America in 1881 and located at Chicago, Ill., where he worked at his trade until 1889, then came to Findlay, O., where he established his present business. Mr. Rieck began on a small scale, but now employs from three to twelve men all the year, and carries on an extensive and profitable business, and is one of the substantial men of Findlay. He is a member of the board of directors of the Majestic Theatre of Findlay. He belongs to the fraternal orders of I. O. O. F. and the B. P. O. E.

Mr. Rieck was united in marriage with Flora M. Watt, a daughter of John Watt, of Findlay, and to them have been born three children: Edna, Anna, and Carl.

HENRY L. LYON, township trustee of Portage Township, Hancock County, O., and also a member of the school board, is one of the representative farmers of this section, operating from 100 to 125 acres of land in this township. He was born on a farm in Allen Township, Hancock County, November 28, 1869, and is a son of E. S. Lyon, an old resident of Allen Township.

Henry L. Lyon was reared in his native township and was afforded excellent school advantages and completed his High School course at Van Buren. Farming and stock raising have been the industries to which he has devoted himself. He owns the tract of twenty-three acres on which he lives, which lies in Section 3, near the Ten Mile church, and he also has a farm of 115 acres in Oklahoma.

Mr. Lyon was married to Miss Isabel Perry, a daughter of Frederick Perry. She was born in Pennsylvania and came to Hancock County when thirteen years of age. Mr. and Mrs. Lyon have two children: Raymond and Grace. Mr. Lyon and family attend the Ten Mile church and he is assistant superintendent of the Union Sunday school connected with it. In politics he is a Democrat and in the fall of 1909 he was elected township trustee and is serving in his third term on the school board, on account of his deep interest in educational matters, willingly accepting the duties and responsibilities of this position. He is identified with the order of Maccabees at North Baltimore, O.

DEWITT C. WESTFALL, D. O., with offices in the Niles Building, Findlay, O., has been established in practice in this city since 1901, coming directly from the American School of Osteopathy following his graduation. Dr. Westfall was born at Grayville, Ill., March 19, 1868, and is a son of Milton and Elizabeth Westfall.

While he was young, Dr. Westfall lived on his father's farm, but the latter moved to Grayville and there conducted a shoe store, later moving to Browns, Ill., where he operated the Westfall Hotel fifteen years and the son assisted in the capacity of clerk. Later, the latter taught school and then, with his two brothers, operated the Southern Illinois cannery, at Browns, Edwards County, Ill., for two years. After selling the cannery, he became a student in Westfield College, at Westfield, Clark County, Ill., after which he entered the ministry of the United Brethren in Christ church, and served as pastor for two years at Seaton, Ill., and the three following years at Alexis, Ill. Loss of health led him to first become interested in osteopathy and later to his attending college at the fountain head, Kirksville, Mo., his subsequent graduation and his successful practice of this method of healing.

Dr. Westfall married Miss Anna E. Johnson and they have two children: Eugene R. and Kenneth Milton. He is identified with the Odd Fellows, the Knights of Osteopathy, the Knights of Pythias and the Court of Honor and retains membership in his college fraternities, Colomentian and the Iota Tau Sigma. Dr. and Mrs. Westfall are valued members of Findlay's pleasant social circles.

MRS. MARY WOLF, widow of the late Levi Wolf and a daughter of William Davis, who was an early settler here, is well known all over Hancock County not only for her womanly qualities but also for her remarkable business capacity. She has resided on her present home farm of fifty-nine acres, which is situated in Section 10, Marion Township, since her marriage. She owns a second farm, situated in Sections 1 and 2, Marion Township, which contains 120 acres.

Mary Davis was reared among almost pioneer surroundings and she had fewer educational opportunities than had those who grew up where settlements were nearer together. She recalls the days when she attended church at Findlay, riding to and from on horseback, the road leading entirely through the woods. She was married August 14, 1851, to Levi Wolf, who was born in Fairfield County, O., August 20, 1825. His parents were David and Lydia (Swartz) Wolf, who came to Hancock County and settled near the Davis homestead. Levi was then a young man and had learned the blacksmith trade and subsequently ran a shop on the farm on which Mrs. Wolf now lives. He purchased a part of this land but before he had time or opportunity to get it cleared, he entered the army during the Civil War. He enlisted in February, 1861, in the 57th O. Vol. Inf., and was taken prisoner at the battle of Shiloh and was incarcerated in Macon, Ga., where he was confined until April 7, 1862. When released he was in such a condition that on his way home he was obliged to go to a hospital and his death followed on July 3, at Cincinnati, from his injuries.

Mrs. Wolf found herself with four children to rear and educate, these being: Margaret Jane, who resides with her mother; Lydia, who is the wife of Dr. J. C. Tritch, of Findlay, and they have two children, Gail and Martha; Fannie, who died at the age of three years; and John, who died when aged thirty-one years. Mrs. Wolf's training in all things practical now stood her in fine stead, enabling her to complete payments on her home farm, acquire more land and make excellent improvements of all kinds. In the course of years she has remodeled the farm house three times and has erected four substantial barns. On her second farm handsome buildings have been erected and eighty acres have been cleared and put under cultivation. On that farm the first oil in Marion Township was discovered, the successful operators being her son, John Wolf, David Davis, her brother, and a Mr. Righter. The drilling was being done for gas but oil was struck, the first well being a 250-barrel well. She has realized $40,000 from oil and there is still some production going on. Mrs. Wolf has always managed her business herself even when her interests have been numerous. She keeps about seventy-five sheep and enough cows to provide for the selling of a large amount of cream. She has always been a hard worker and her mind has been as strong as her body. Her husband was a leading man in public affairs in his township and was elected township treasurer on the Republican ticket.

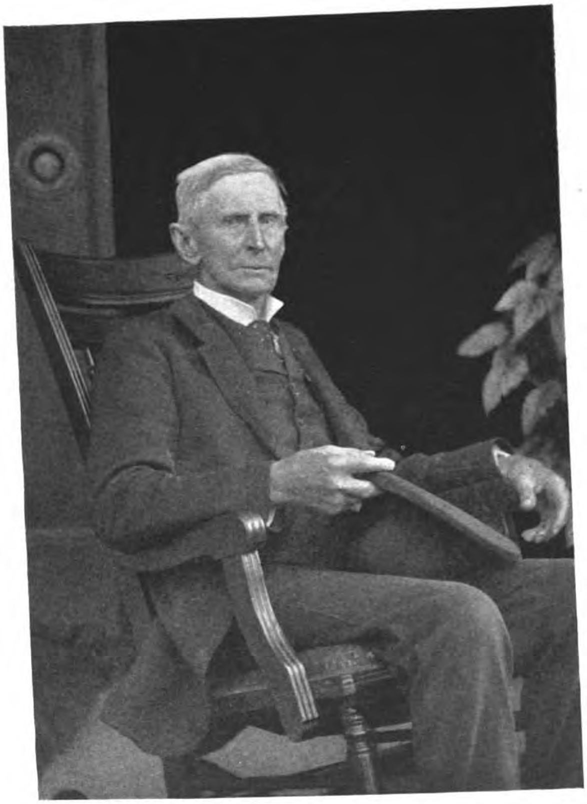
JOHN POE, deceased, formerly a member of the law firm of Poe & Poe, at Findlay, O., was one of the Nestors of the bar in Hancock County, his practice covering a period of thirty-one years. He was born on a farm in Liberty Township, Hancock County, O., November 22, 1849, and died at Findlay, September 22, 1909.

Robert Poe, father of the late John Poe, accompanied his father, Jacob Poe, from Chillicothe, O., to Hancock County, in childhood, and one of his brothers was the first white child born in the county.

John Poe was reared on his father's farm and first attended the country schools, and was sent from there to Allegheny College, at Meadville, Pa., where he graduated with class honors. For some time afterward he engaged in teaching school and for one year following his graduation from college he was principal of the Findlay High school and for one year more was superintendent of the schools of Carey, O. He then entered upon the study of law with Attorney Aaron Blackford, and was admitted to the Ohio bar in 1878 and immediately located at Findlay. For many years he commanded a large practice and remained alone until his son, Merle N. Poe, had completed his literary and law education, when he was admitted to partnership. The firm of Poe & Poe continued the legal success which had attended the senior member's practice and a large amount of important litigation in the courts of the county was entrusted to them. John Poe was honored and trusted by hundreds of clients and he was known to his associates and to his fellow citizens in general as an able lawyer, a scholar and a gentleman.

John Poe was married to Miss Sarah C. Trout, who was born on a farm in Allen Township, Hancock County, and is a daughter of George Trout. Three children were born to them: Merle N., Caroline, wife of W. B. Newton; and Janet.

Merle N. Poe was born at Findlay, O., March 30, 1875. He attended the schools in his native city and was graduated from the Findlay High School in 1893, and then entered Princeton University, where he was graduated in 1898. Later he read law under his father's supervision and completed his studies in the New York Law School, and subsequently became a member of the law firm of Poe & Poe. He is affiliated with the Elks, the Odd Fellows and the Modern Woodmen and for some time has taken a



LORENZO FIRMIN, M. D.

large amount of interest in military matters and is captain of Co. A, 2nd Ohio National Guard.

LORENZO FIRMIN, M. D., deceased, for almost forty years was a citizen of Findlay and his name is identified with much that has brought this city into deserved prominence and which contributed to its advance in substantial and material lines, as well as on the higher levels of professional and social effort. Dr. Firmin was born March 31, 1808, at Wilbraham, Mass., and was a son of John and Lovina (Green) Firmin, his parents coming of old established New England families.

Dr. Firman remained under his father's roof until he was twenty-two years of age, during that time obtaining educational training in the village schools and under his father a knowledge of shoemaking. In 1834 he came to Ohio, and at Richland, in Summit County, embarked in a tanning business with Dr. Rawson. In 1838 he was married to Miss Clara Harriet Rawson, a daughter of his partner, and he then came to Findlay and established himself in the shoemaking business. Shortly afterward, however, he began the study of medicine, under the supervision of Dr. Bass Rawson, completing the course as then required and entering into practice. With the exception of one year, during which he followed his profession at Benton Ridge, Dr. Firmin's whole period of professional activity was spent at Findlay, where he continued in active practice until his retirement, in 1877. During three years of this time he was associated with Dr. F. W. Firmin. In the meanwhile he had become interested in business enterprises to which he later gave closer attention with corresponding advantage. Many of them grew to important proportions, and through them he derived the fortune with which he was so ready and willing, at all times, to help the unfortunate or to aid public-spirited, philanthropic and benevolent movements. As one of the organizers of the First Congregational Church at Findlay, he was ever generous in contributing to its support, and he was equally liberal in his contributions to the Y. M. C. A. of this city; on many occasions also Oberlin College benefited through his generosity. Dr. Firmin was widely known and was held in high esteem, for he possessed many endearing personal qualities. In early manhood he was a Democrat but later he identified himself with the Republican party, though from disinterested motives, as he invariably declined political honors. He attained a venerable old age, retaining his faculties to a remarkable degree, passing quietly out of life on October 12, 1901.

Dr. Firmin was twice married. His first wife died in 1891. In 1894 he was united to Miss Mary B. Humphrey, who was born at Findlay, Ohio, and is a daughter of Jarvis and Julia (Barber) Humphrey. Mrs. Firmin was the youngest of her parents' family of six children and the only one born in Ohio. She was educated at Findlay and for some years prior to her marriage was a successful teacher. She resides in her beautiful home at No. 914 North Main Street, Findlay.

JARVIS HUMPHREY, deceased, was one of Hancock County's well known residents and here he spent the greater part of a long and exemplary life. He was of English ancestry but of New England parentage. His father, Dudley Humphrey was born at Simsbury, Conn., and at the same place, Jarvis Humphrey was born in 1809. The latter was among the agriculturists who sought homes on the rich lands of Hancock County, in 1851, bringing his wife and five children from Connecticut. He was a man of some substance and the family resided at Findlay during the months in which he was selecting a farm for purchase, to which they subsequently moved. At Simsbury, Conn., he had married Julia Barber, who survived her seventy-seventh birthday. The children of this marriage were the following: Chauncey D.; Marion, Mrs. George E. Cook; Ellen A., Mrs. B. O. Robinson; Justine, Mrs. John H. King; Jarvis S.; and Mary B., who is the widow of the late Dr. Lorenzo Firmin of Findlay.

Jarvis Humphrey continued his agricultural pursuits until far beyond middle life and then retired to a comfortable home at Findlay where his death occurred April 21, 1897, when he had rounded out eighty-four years. In his religious connection he was an earnest member of the Congregational church. Although never an office-holder, he was actively interested in public matters and cast his vote with the Republican party.

REV. JOHN J. NONNAMAKER, one of Mt. Cory's highly esteemed retired citizens, is the owner of valuable real estate here and owns also a valuable farm of 180 acres, which is situated in Section 33, Union Township, and Sections 3 and 4 Orange Township, Hancock County, O. He was born on a farm in Eagle Township, two miles east of Canonsburg, O., January 7, 1842, and is a son of Ami Lucinda (Houdeshell) Nonnamaker.

Ami Nonnamaker was born in Germany and was six years old when he accompanied his parents to America, in 1815. His parents settled in what is now Fairfield County, O., and there they died. Ami Nonnamaker later moved to near Canonsburg, where he entered 160 acres of Government land and there John J. grew to manhood and his father engaged in farming until advanced in years when he moved to Mt. Cory, where he died in October, 1884. For years he was a prominent man in Eagle Township, a leader in Democratic politics, and several times served as township trustee. He married Lucinda Houdeshell, who was born in Pennsylvania and was brought to Fairfield County by her parents, in childhood. She died at Canonsburg, July 5, 1855.

John J. Nonnamaker was reared and educated in Eagle Township. He was nineteen years of age when he enlisted, on November 1, 1861, for service in the Civil War, becoming a member of Co. G, 57th O. Vol. Inf., under command of Captain Wilson. He remained in the army until he was honorably discharged on August 14, 1865, at Columbus, O., having been mustered out at Little Rock, Ark. Although he was ever at the post of duty and participated in such notable battles as Pittsburg Landing and Champion Hill and marched many times through the enemy's country, he was never either wounded or captured. He returned then to peaceful pursuits, settling in Orange Township, Hancock County, after his marriage in 1866. A few years later he became a minister in the Evangelical church. His first charge was at Mt. Cory, in Hancock County and after that he was stationed as follows: two years in Logan County; two years in Putnam County; three years at Wilmot, Stark County; seven years in Coshocton County; Melmore, Seneca County; then to

Pickaway County and from there to Bowling Green. At present he accepts calls in this locality.

Mr. Nonnamaker was married in 1866, to Miss E. M. Spangler, who was born and reared in Hancock County. For some years prior to her marriage she taught school in Union Township. Seven children were born to this marriage: Dora, Marion E., Lois, Mary, Clara, Minnie and William A. Marion E. married Anna Gulick, of Seneca County, and they have one daughter, Anna. He is a professor of a college in Illinois. Lois died at Mt. Cory, May 1, 1906, aged thirty-four years. She was a highly educated lady and for twelve years taught school in Wayne, Ashland, and Hancock Counties. Mary married William O. Smith of Richland County, O., after teaching three terms of school in Ashland County. Mr. and Mrs. Smith have four children: Fay, Vinton, Noel and Marion. Clara died at the age of three years, and Minnie died at the age of ten months. William A. is a teacher and for five years has been identified with a school at Duluth, Minn. He married Augusta Goetz, of St. Louis County, Minn.

ROSS J. WETHERALD, attorney at law, with offices at No. 239 South Main Street, Findlay, O., in the Headquarters Block, is an able member of the Hancock County bar and has been established here since 1895 and has built up a large and substantial practice. He was born at Bellaire, Belmont County, O., March 18, 1873, and is a son of Sylvester R. and Mary R. (Jennings) Wetherald.

The late Sylvester R. Wetherald was a prominent manufacturer at Findlay. In 1888 he brought his family to Findlay and the Wetherald firm, of which he was a member, built the works of the Wire Nail Company here and he was engaged in business until the time of his death, in 1892. His widow survives.

Ross J. Wetherald entered the High School when the family came to Findlay, where he was graduated in 1891, after which he attended Findlay College for one year and then began the study of law first under the direction of Hon. A. E. Kerns, formerly probate judge, and later at the Ohio State University, where he was graduated in 1895. Mr. Wetherald retains membership in his college fraternities, the Phi Delta Phi and the Phi Gamma Delta, and is past chancelor of the order of Knights of Pythias and a member of the order of the Knights of Khorrassan. He belongs to the First Presbyterian church at Findlay.

S. G. ROBINSON, whose farm of 160 acres is situated in Sections 3 and 4, Blanchard Township, Hancock County, O., was born in Erie County, N. Y., May 29, 1831, and is a son of Benjamin E. and Sarah (Gail) Robinson.

Benjamin E. Robinson carried on the tanning business in Erie County, N. Y., before he came with his family to Ohio, in 1838, and settled in Franklin County, on the National Turnpike road, eleven miles east of Columbus. Of the seven children born to Benjamin E. and Sarah Robinson, five survive. Mr. Robinson also has two half-brothers living and one half-sister.

S. G. Robinson was seven years old when his parents moved to Ohio and he attended the district schools in Franklin County. He was twenty years of age when he came to Blanchard Township, Hancock County, and he has seen many wonderful changes. He carried the chain in the surveys made for many of the roads through this section and at times has followed an Indian trail which was not more than ten inches wide and in some parts not more than four or five inches, as far as the Maumee River. Mr. Robinson cleared up the greater part of his farm by himself and has devoted the land to general agriculture. He has been one of the leading men of his section and for twenty-four years has been a justice of the peace. Being of a peaceful disposition himself, he has been able to settle many cases out of court and thus has saved much trouble and expense to those who found it necessary to have their differences adjusted by some one with the right sense of justice. In politics, Mr. Robinson is a Republican.

Mr. Robinson was married in February, 1859, to Miss Mary Ann Haddox, a daughter of Enoch Haddox, of Blanchard Township, and five children were born to them: Edward, Stella, Ida, Samuel and Alexander. After the death of his first wife he married Emma (McKain) Day, a daughter of James McKain, of Pittsburg, and later of Toledo, O. Mr. Robinson has long been one of the representative men of Blanchard Township.

W. C. BUNN, whose valuable farm of 160 acres is situated in Section 1, Union Township, Hancock County, O., was born in Blanchard Township, Hancock County, March 1, 1863, and is a son of John and Catherine Bunn.

John Bunn was born in Muskingum County, O., and was ten years old when he accompanied his parents, Reed Bunn and wife, to Putnam County, where the father entered eighty acres of Government land. John Bunn still survives and has worked at the carpenter trade ever since early manhood and is also a farmer. His wife was born in Stark County and accompanied her parents to Hancock County where she was reared and married. Her death occurred March 1, 1902, at the age of sixty-four years.

W. C. Bunn was reared in Hancock County and obtained a common school education. In 1884 he married Miss Ellen Perkins, of Putnam County, O., a daughter of one of the prominent old pioneers. In that county, Mr. and Mrs. Bunn started housekeeping. In 1909 they came to the present farm which is situated one and one-half miles north of Rawson, on the Findlay road. Mr. Bunn carries on general farming and stock raising, keeping hogs, sheep, horses and cattle.

Mr. Bunn and wife have five children: David, Ethel, Carl, Catherine and Erwin. He is not very much interested in politics but keeps well posted on current events and in every respect is a good citizen. For a number of years he has been identified with the Masonic fraternity at Findlay.

GEORGE F. TROUT, of the firm of Trout Brothers, proprietors of a furniture store at No. 311 South Main Street, Findlay, O., and president of the Ohio Paint and Stain Company, also of Findlay, has been a resident of this city since 1898. He was born at Van Buren, Hancock County, O., January 19, 1873, and is a son of Judson B. Trout, who resides on his farm near North Baltimore, O.

In 1884, when George F. Trout was about eleven years old, the family moved to North Baltimore, in Wood County, and there he was educated, graduating from the North Baltimore High School in 1893. He married Miss Carrie Crites, a daughter of Samuel Crites, and they have one daughter, Irene. Mr. Trout is a member of a number of fraternal organizations including the Knights of Pythias, the Odd Fellows and the Modern Woodmen of America.

The firm of Trout Brothers is composed of George F. and Len L. Trout and S. J. Chesbro and in addition to carrying on their large store at Findlay, they operate a furniture store at North Baltimore which is under the immediate supervision of Len L. Trout. The works of the Ohio Paint and Stain Company are situated on the corner of Taylor and Walnut Streets, Findlay. This company was organized January 1, 1910, from the old Ohio Paint and Varnish Company, of which Mr. Trout was president as he is of the present company. Other officers are: Hiram Van Campen, secretary, and John H. Williamson, manager of the works. When the Trout Brothers came first to Findlay they established their store in the Marvin Theater Block, on North Main Street, moving from there to their present location in February, 1909. During his first two years of residence at Findlay, Mr. Trout ran an oil lease but since then has given his main attention to merchandising. He is numbered with the city's progressive, wide awake and enterprising citizens.

D. L. NORRIS, one of the substantial and representative citizens of Marion Township, Hancock County, O., who is serving in his fourth term as township treasurer, owns 220 acres of fine farm land in this township, separated into three tracts, the home farm in Section 3, containing eighty acres. He was born in Fairfield County, O., May 13, 1848, and is a son of Alexander M. and Maria (Stone) Norris.

Alexander M. Norris was born in Maryland, in 1808, and came to Ohio in 1835. His father was Alexander Norris, who was of English ancestry. Alexander M. Norris was one of a family of fourteen children and he and his brother William were the only ones to come to what was then the West, and William died in Fairfield County, but Alexander M. came to Hancock County when his son, David Lewis, was but a child. For some years he followed the shoemaking trade and then bought a small place. He died in 1898, at the age of ninety years. He was twice married, by his first wife having four children: William H., Mary F., Elizabeth and Sarah J. Mary F. is the only survivor and is the wife of Samuel Mosier. His second marriage was to Maria Stone, who was born in Virginia, and three children were born to that union: George W., David Lewis and Anna, who is the wife of Henry Borough. The mother of these children died in 1893, at the age of eighty-two years.

David Lewis Norris was four years old when his parents moved from Fairfield to Hancock County and settled on the farm on which he lives. His father bought his first twenty acres from R. Foltz and subsequently added until he became possessed of a large estate. David Lewis grew to manhood here and his education was secured in the district schools. When he reached man's estate he took charge of the farm and later purchased it and has carried on farming and stock raising here. His sisters lived with him until their death and since then Mr. and Mrs. M. E. Hartman have resided here, Mr. Hartman at present being the practical farmer. The farm house was built by the father of Mr. Norris and at times the present owner has repaired it and has erected the other buildings now on his land, including those on his other farms.

In politics, Mr. Norris is a stanch Republican and he has served frequently in township offices, as noted above, being township treasurer and formerly was township clerk, and in 1889 was his party's candidate for county recorder. He is a member of Findlay Lodge No. 73, Odd Fellows, and of the Golden Rule Encampment, and is a charter member of the local Grange.

SOLOMON SHAFER, owner of 330 acres of fine farming land in Delaware Township, Section 11, and seventy acres in Mt. Blanchard Sections 1 and 2, upon which he lives, was born in Knox County, O., March 23, 1836, a son of Michael and Nancy Shafer. The father came to Hancock County in 1835, with two of his eldest sons, and two of his eldest daughters, and cleared a small piece of land, on which he built a log cabin. In the following spring he was joined by his wife, who made the journey on horseback, carrying her little six-weeks old son, the subject of this sketch. Their farm was located in Section 12, half a mile south of Mt. Blanchard. Michael Shafer added to his little property from time to time until he finally became one of the largest land owners in Hancock County, a result which speaks volumes for his industry and perseverance. He died on his farm in Section 1, on August 16, 1862, being survived for eight years by his wife. She was a native of Ireland, coming to this country with her parents, who settled in Knox County, where they engaged in farming. She and her husband were the parents of twelve children, of whom the subject of this sketch was the ninth in order of birth.

Solomon Shafer was reared in Delaware Township, attending the country schools in boyhood and also the city schools at Mt. Blanchard. During his leisure hours he was gradually initiated into farm work, which subsequently became his life occupation. In 1859 he bought out the heirs of his father's estate, and in the following year he married Mary Elizabeth Hoge, who came to Hancock County from Belmont County, O., with her parents, when thirteen years of age, they settling on a farm in Amanda Township, this being about the year 1851. Subsequently they removed to the State of Iowa, where Mr. Hoge bought a farm, upon which he later died—in 1885. His wife passed away three years afterwards.

Soon after his marriage our subject began housekeeping upon his 70-acre farm in Sections 1 and 2, which property he has since cut up into city lots. Upon his other property he carries on general agriculture and has been quite successful in this occupation, partaking of the prosperity which farmers in general are now enjoying throughout the country. He and his wife have had one child, Anna Lorena, who is now the wife of Lewis Renfrew Kious, of Madison County, and the mother of five children—Clifford Shafer, Mary Louise, Lewis R., Lorena and Elizabeth. Mr. and Mrs. Shafer attend the Methodist Protestant church. From 1865 to 1869 Mr. Shafer served as county auditor, being elected on the Democratic ticket, and living during those four years in Findlay. The rest of his life has been spent in Mt. Blanchard.

FRANK C. SHANK, county auditor of Hancock County, O., is well and favorably known all over this county, belonging to one of its prominent old families and for a number of years being active in political circles. He was born in Union Township, Hancock County, O., August 20, 1873, and is a son of Albert and Mary E. (Watson) Shank.

Albert Shank was born in Allen County, O., and came from there to Hancock County where he followed an agricultural life until his decease in 1892. He married Mary E. Watson, a native of Mahoning County, O., who survives.

Frank C. Shank was reared on his father's farm and after attending the country schools for some years, began to teach school, first in Union Township, for thirty-two months, and later at the village of Rawson for thirty-one months. He had always been a zealous Republican and after he left the school-room he was elected deputy county auditor and served in that office for seven consecutive years. He was elected in the November election of 1908 to the office of auditor, assuming the duties of this office on the third Monday in October, 1909, and was one of the two Republican county officials, out of sixteen candidates, who were elected. Mr. Shank's long experience as deputy particularly qualified him for this office, in which he is efficient and popular.

Mr. Shank married Miss Gertrude Crist, who was born and reared in Eagle Township, Hancock County, and they have two children: Mary and Josephine. Mr. Shank is a member of a number of fraternal organizations, including: the Knights of Pythias, the Odd Fellows, the Maccabees, the Elks, and the Sons of Veterans.

JACOB ANTHONY KIMMELL, M. D., was born on a farm near the village of Oneida, Carroll County, Ohio, on the 17th day of September, 1844. He was a son of David and Christena Oaks Kimmell, the former of Dutch and the latter of English descent, and was the eighth of a family of ten children, of whom three are still living.

In October, 1851, the family moved to Hancock County, and settled on a farm in Marion Township about three miles from Findlay. Here he attended the country common schools and at the age of sixteen obtained a county certificate and taught school in the winter time and attended the Findlay select school in the autumn season for two years, when in February, 1863, he enlisted for three years in Co. A, 21st Ohio Volunteer Infantry, and served to the close of the war, receiving his discharge from the service May 30th, 1865. He was present and took part in numerous skirmishes and battles of the Civil War, among the most prominent of which was Chickamauga, Tunnel Hill, Rocky Face, Resaca, Kenesaw Mountain, New Hope church, Chattahoocha and Atlanta, serving with General W. T. Sherman in the "One hundred and twenty days' fight" from Chattanooga to Atlanta. Upon the arrival of Sherman's army at Atlanta, he was taken with rheumatism, and sent back in stages to Chattanooga, Nashville, and Jeffersonville, Ind. Fully recovering at the latter place, he received a detail as prescription clerk in the Joe Holt General Hospital, of twelve hundred beds, where he remained until the close of the war.

Upon his return home, he taught one year in the Findlay schools, read medicine and attended the Medical Department of the Western Reserve University at Cleveland, Ohio, graduating in the class of 1869. In 1875 he took the ad eundem degree at Bellevue Hospital Medical College, New York, and a Post Graduate course in the same city in 1898. He commenced the practice of medicine at Cannonsburg, Hancock County, O., and was postmaster of that village under Grant's administration, but has practiced his profession in Findlay continuously since 1872.

In politics, Dr. Kimmell has always been a staunch Republican, and has served as a member of the city council and municipal gas trustee; he was appointed on the board of pension examiners by President Harrison. In 1895 he was elected to the Ohio Legislature from Hancock County by a majority of 631, this being the largest majority given to a representative from this county in its history, and at this time secured the passage of the medical law of Ohio for the examination and registration of physicians and surgeons within the State. He has held the position of surgeon on the Cleveland, Cincinnati, Chicago & St. Louis Railroad for twenty-two years, and was president of the railroad surgeons of that system in 1909.

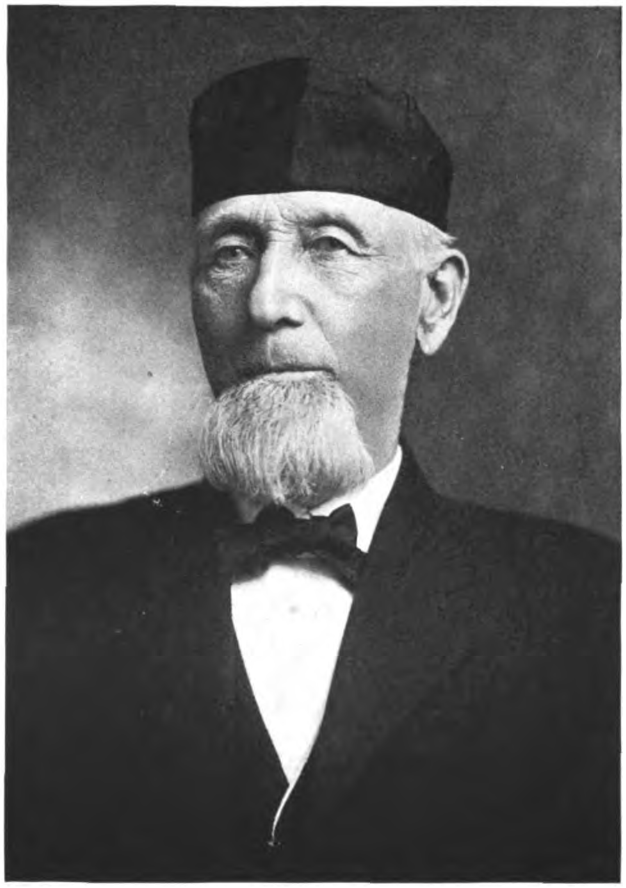
Dr. Kimmell is a member, and has been president of, the Hancock County and Northwestern Ohio Medical Associations; he is also a member of the Ohio State, National and International Medical Associations, as well as examiner for a number of the large life insurance companies.

The Doctor has been an extensive traveler, having been in every state and territory in the United States, the British Maritime Provinces, Canada, Alaska, Mexico, Central America, Cuba, and the Isle of Pines in the Western Hemisphere, and has visited almost every country in Europe as well as the western part of Asia and the northern part of Africa. Owing to this extensive intermingling with people of different political and religious views, he has become quite liberal in his views, and charitable to all, and while he is not a member of any church, he holds strongly to the Unitarian creed.

Having had the misfortune to lose two wives, he was married the third time August 30th, 1909, to the estimable Mrs. Effie Afton Gibson, of Detroit, Mich. He has one son, Alfred Graber Kimmell, by his second wife, Rosa Evelyn Kimmell.

HON. D. P. HAGERTY, once a member of the General Assembly from Hancock County, O., and a prominent retired farmer of Liberty Township, resides on his farm of 142 acres, which is located in Section 18. He was born April 3, 1844, in Fayette County, Pa., on the Pittsburg and Uniontown Road and is a son of Samuel and Maria (Gween) Hagerty, both natives of Fayette County, Pa. Samuel Hagerty, who was a mason by trade, spent his entire life in Fayette County, Pa. He was the father of five children, and he and his wife and two sons all died within two years, and were buried at Liberty, Fayette County, Pa. Our subject's two sisters reside in Fayette County. Mr. Hagerty was politically a Democrat.

Hon. D. P. Hagerty was reared and spent the first thirty years of his life in Fayette County, Pa., and there obtained his education in the public schools. He was engaged in farming there for some years after his marriage and also in Westmoreland County. In 1874 he came to Hancock County, Ohio, and settled on his present farm of 142 acres in Liberty Township, where he followed general farming and stock raising until 1905. He has since continued his residence here, overseeing his farming interests, and during the busy season he lends a helping hand with the work. In 1908 he was elected a member of the General Assembly, and has since received the nom-



HON. D. P. HAGERTY

ination for a second term. He was a member of the Farmers' Institute of Benton Ridge of which he served five years as president, and was also a member of the McComb Farmers' Institute.

Mr. Hagerty was married in Fayette County, Pa., in 1865, to Sarah Browneller, a daughter of Samuel Browneller, who was a native of eastern Pennsylvania. Of their union were born the following children: Lizzie D., who is the wife of A. T. Richard, of Findlay, Ohio; A. L., who married Clifford Hauver, of Tippecanoe City, Miami County, Ohio; Anna B., who is residing at home; Samuel J., who married Permilla M. Eshelman; and Emily, living at home.

GEORGE F. SHARNINGHOUSE, who resides on his excellent farm of eighty-three acres, eighty of which lie in Section 21 and three acres in Section 28, Portage Township, Hancock County, O., owns also a life lease in thirty-eight and one-half acres, situated in Section 33, the same township. He was born in Pleasant Township, Hancock County, October 24, 1875, and is a son of William and Dora (Kuhlman) Sharninghouse.

William Sharninghouse was born in Hanover, Germany, December 12, 1849, and is a son of Henry and Mary Sharninghouse. His people were in humble circumstances and when he was seven years old he had to go to work to help support the family. After working for a time at herding cows, he bound himself out for a period of five years, under these conditions: for the first year he should receive nine dollars; for the second year, twelve dollars; fifteen dollars for his third year of service; forty dollars for the fourth year and fifty dollars for the fifth year. In those days that looked like a very large amount of money for a poor boy to earn. He kept faithfully to his contract and at the expiration of it had $126 comig to him. In the meanwhile he had heard much of the land of prosperity and opportunity across the Atlantic Ocean and when he received the money his toil had earned, he paid out a goodly portion of it for a ticket on a sailing vessel for America. He landed in the United States in 1869. He immediately sought employment but before he found any work that he could do, his money had dwindled to six dollars. After reaching Hancock County, O., he secured work in Allen Township as a farm hand and in four and one-half years had saved the sum of $500. He kept on working, sometimes renting land for a season or two and by 1881 was able to purchase seventy acres for himself. In 1896 he added enough more to make his farm 150 acres, located in Portage Township, where he has long been a leading farmer and respected citizen. In 1872 he married Dora Kuhlman, who died in 1904. They had four children: Amelia Jane, George F., Henry W., and Ora. Mr. Sharninghouse and sons all belong to the German Lutheran church.

George F. Sharninghouse was a babe when his parents moved into Portage Township and here he grew to manhood and attended the country schools in his youth. His business has always been farming and stock raising and he has met with much success in his efforts. He bought his farm in the winter of 1909-1910 and moved on it in the following spring.

Mr. Sharninghouse married Miss Jennie Pearl Mowery, a daughter of George Mowery, a prominent farmer of Pleasant Township, where she was born and reared. Four children have been born to this marriage: Ralph, Joice, Zella May and Dorothy. Mr. Sharninghouse has taken an active interest in township affairs and has served as a member of the school board of Portage Township since March of the current year.

JOHN H. JELLEY, an enterprising farmer and highly respected citizen of Allen Township, Hancock County, O., is the owner of 127 acres of highly cultivated farm land, fifty-seven acres lying in Cass Township, and the remaing seventy acres, adjoining being in Section 20, Allen Township. He was born December 7, 1848, on a farm in Cass Township, Hancock County, O., and is a son of John H. and Hannah (Johnston) Jelley.

John H. Jelley, was born in Jefferson County, O., on a farm, through which the line dividing Jefferson and Harrison Counties ran, and was there reared to maturity. In 1840, on the eve of Hallowe'en, he first came to Hancock County, and after remaining but a short time, went to Coshocton County, O., where he had two brothers living. He subsequently returned to Hancock County and purchased a farm in Section 32, Cass Township, and there spent the remainder of his life, his death occurring May 13, 1880. He was first united in marriage with Hannah Johnston, who died April 1852, and his second union was with Ann Maria Spangler, who died December 27, 1866. His third marriage was with Mrs. Susan (Johnson) Cratty, a widow of Hiram Cratty, who died while in service in the Civil War.

John H. Jelley, subject of this sketch, was reared in Cass Township, his father's farm being the scene of his boyhood activities, and with the exception of ten years spent at carpentering, has always followed general farming. For two years after his marriage he rented a farm in Allen Township, but in November, 1882, located on his present farm, which he had purchased some time before, and has here carried on general farming. Mr. Jelley is one of the substantial and enterprising citizens of the township, and has served six years as justice of the peace of Allen Township.

Mr. Jelley was married to Rozena Mellott, who is a daughter of Elijah and Jane (Kline) Mellott, and is a granddaughter of Obadiah and Katherine (Sipes) Mellott, natives of Bedford County, Pa. Obadiah Mellott was of English descent and his wife of German ancestry. He died in 1862, and his wife died in 1859. Elijah Mellott was born in 1820 in Bedford County, Pa., and was married there in 1842. In 1851 he located in Ashland County, O., and four years later came to Hancock County and purchased eighty acres of land in Allen Township, which he later increased to 117 acres. Mrs. Elijah Mellott died in Allen Township in 1891, and is still survived by her husband, who resides with his son, John H. Mellott, of Allen Township.

Mr. and Mrs. Jelley became the parents of the following children: Jenny Pearl, who teaches music in Findlay, O.; Eiljah Oral, who teaches the school of District No. 5 of Allen Township; Cleveland Hazlett, who is employed as a machinist at Detroit, Mich.; Elva J., who is employed as an oil pumper, married Belva Shafer, and they have one child, Gale Lillian; Leland Laverne, who died aged seven months and twenty-eight days; Clarence Ithel; James Jule; Harland Henry; and Bernard Lowell.

C. E. BECK, who enjoys the distinction of being the youngest business man in the growing little city of Mt. Blanchard, O., is also numbered with the most prosperous. He was born at Mt. Blanchard in December, 1873, and is a son of Peter and Katherine (Morehart) Beck.

Peter Beck is one of Mt. Blanchard's leading citizens. He was born in Amanda Township, Hancock County, O., and followed farming until he moved to Mt. Blanchard, where he was appointed postmaster by the late ex-President Cleveland. His wife died when their son, C. E. Beck, was small.

C. E. Beck was educated in his native place and after leaving school he became a clerk in the post office and remained with his father until the close of his term as postmaster. He then opened up a retail grocery and has demonstrated much business ability and commands a large amount of the most desirable city trade.

In November, 1895, Mr. Beck was married to Miss Mamie E. Bell, a daughter of J. T. Bell, of Mt. Blanchard. Mr. and Mrs. Beck have two children: Helen and Katherine. With the other representative business men of the city, Mr. Beck is identified with the Masons and the Odd Fellows and is the treasurer of both organizations at Mt. Blanchard.

DON. B. BIGGS, M. D. The medical profession at Findlay, O., has many able representatives and among these may be mentioned Don. B. Biggs, M. D., who has been established in practice in this city for the past eight years. He was born at Arcadia, Hancock County, O., June 16, 1873, and is a son of Rev. Peter and Anna (Eyer) Biggs.

Rev. Peter Biggs is now living retired at Findlay, after a continuous service of thirty-three years in the Methodist ministry. Few residents of Hancock County are better known or more highly esteemed.

Dr. Biggs attended the public schools of Hancock County and afterward spent three years at Louisville, Ky., and then entered Starling Medical College, at Columbus, O., where he was graduated in the class of 1902. In August of the same year he came to Findlay where he has built up a substantial practice. He is a member of the Hancock County, the Northwestern, the Ohio State and the National Medical Societies. He is affiliated with the Elks, the Knights of Pythias and the Modern Woodmen of America.

JOHN BRENNER, justice of the peace and leading citizen of Cass Township where he is held in high esteem by his fellow citizens, in association with his son owns 287 acres of fine land, of which, the home farm of eighty acres lies in Section 25, while the remainder is in Section 13, almost adjoining. Mr. Brenner was born October 12, 1846, in Washington Township, Hancock County, O., and is a son of Mathias and Caroline (Mouser) Brenner.

Mathias Brenner and wife were both born in Wittenberg, Germany, and shortly after their marriage they embarked for America. Travel in those days was slow and laborious and we are not surprised to learn that a stage journey of eighteen days had to be undertaken before they reached Havre, where the steamer was ready to carry them to the unknown land across the ocean. Mathias Brenner was a skilled blacksmith and after they reached Philadelphia, he found work at his trade and two years later came to Ohio. In partnership with his brother-in-law, Jacob Hofer, he bought fourteen acres of land in Mulberry Township, Stark County, and together they carried on a blacksmith business for two years. They then came to Hancock County, where Mr. Hofer bought forty acres in Washington Township, while Mr. Brenner purchased thirty acres from Peter Wyant. He continued to work at his trade but found time to clear twenty acres of his land and build a round log house and shop and later one of hewn logs and still later erected better buildings. Mr. Hofer, however, apparently became discouraged as he sold out and moved to Williams County where he subsequently died. Within five years, Mr. Brenner sold his thirty acres to such good advantage that he was able to buy eighty acres in Section 25, Cass Township. He was a man of enterprise and courage. He walked the whole distance to Coshocton County in order to pay the sum of $462.50, for this land, prudently putting $3 in his pocket for expenses on the way. He accomplished his purpose and when he reached home had one-half of his expense money still in his pocket, proving himself a man of resource and expediency. This trip he made in August, 1847. He continued to live on that land until within six years of his death when he sought the comforts of his son's fireside, his wife having died, and here he passed away in April, 1897, at the age of eighty-six years. There were four children: Rosean, deceased, married first John Scott and second Joseph Foust; Mary, deceased, was the wife of Henry Pfeiffer, also deceased; John, and Caroline, deceased, was the wife of Fred Mouser. The mother of the above family died in August, 1890, aged seventy-five years.

John Brenner was one year old when his parents came to Cass Township and here he grew to manhood, in his boyhood attending the district and later private schools, and the High School at Findlay. For thirteen years he continued to work on the farm during the summers and teach school in the winters and in the fall of 1874 he purchased sixty-four acres of his present farm from Joseph Linhart. Five years later he added forty acres and still later the home farm of eighty acres, and still later, in partnership with his son Henry, bought 103 acres, situated in Section 13, all of which is under the farm management of Henry Brenner.

On October 6, 1872, Mr. Brenner was married to Miss Mary Ann Myers, a daughter of Gotlieb and Mary (Ott) Myers, natives of Germany. Five children were born to this union, namely: Henry; Ella, who is deceased, was the wife of C. P. Taylor, and the mother of two children—Ethel and Genevieve; Ida, who is the wife of C. P. Taylor; John W., who died aged eleven years and five days; and Treva Netta. Mr. Brenner and family are members of the Methodist Episcopal church. In politics he is a Democrat and has frequently been elected to township offices, serving as school director and township clerk and also as justice of the peace. He is identified with the order of Ben Hur, of Findlay.

C. R. BURNETTE, Ph. G., the owner and proprietor of the best equipped and most modern drug store, of its size, in Northwestern Ohio, has been established in business for himself at Mt. Blanchard, Hancock County, since 1902, in which year he was appointed postmaster. Mr. Burnette was born at Orangeville, in Trumbull County, O., and is a son of John W. and Alice (Seiple) Burnette, natives and residents of Orangeville.

C. R. Burnette attended the schools in his native place and when twenty-two years old entered the Ohio Normal University of Ada, and was graduated there in pharmacy in 1900. He came then to Mt. Blanchard and for two years managed a drug store which he then bought. He carries only the drugs and preparations which are guaranteed by the Pure Food & Drug law, together with the usual line of merchandise now found in every drug store and in addition has a department fitted up with a full line of wall paper, books and jewelry. He is a man of much enterprise and his business qualities are freely recognized by his fellow citizens who have sought his services on many boards.

In 1901, Mr. Burnette was married to Miss Dawn Pugh, a daughter of Newton and Mary Pugh, who were people of prominence in Delaware Township. Mr. and Mrs. Burnette are members of the Methodist Episcopal church and Mr. Burnette has been a member of its board of trustees for a term of years. He is also trustee and treasurer of the cemetery board. He is identified fraternally with Lodge No. 519 F. & A. M., and Lodge No. 481 Knights of Pythias, both of Mt. Blanchard.

JOHN B. HEIMHOFER, president of the Commercial Bank and Savings Company, of Findlay, O., and a prominent old producer, has been a resident of this city since 1886. He was born in Switzerland, November 13, 1863, and is a son of John M. and Agatha (Miller) Heimhofer.

John M. Heimhofer was born, reared and married in Switzerland. When he came with his family to America he settled in what is now Lackawanna County, Pa., where he secured employment in the coal mines, but later became interested in the oil fields, at which time he moved to Red Rock, in McKean County. Later on in life, when his son, John B., came to Findlay, he and wife accompanied him and in this city Mr. Heimhofer died in 1904, but his widow survives. They had three children: John B., Fred H. and Ida.

John B. Heimhofer was quite young when his parents came to America. He was afforded educational advantages, being sent to a select school at Archibald, Pa., and was seventeen years old when he went with the family to McKean County. There he engaged in teaming in the oil fields for a time and then entered into partnership with his brother and E. V. Wyssbrod and together they purchased a lease in the Bradford oil fields and thus his start was made in the path which has resulted in his becoming so successful an oil producer. In a short time they acquired other leases and kept on until they owned seventy-two wells. In 1886 the firm disposed of its holdings in Pennsylvania and in November of that year opened a hardware store at Findlay, O., under the firm name of Wyssbrod & Company. This business was continued for three years and at the end of that time the firm resumed operations as oil producers.

In 1899, Mr. Heimhofer purchased a fine farm but he has placed tenants on it. In 1901, when the Commercial Bank and Savings Company was organized, he was elected vice-president and became president on January 1, 1910. He has additional interests both at Findlay and other points. He is a director in the Findlay Sucker Rod Company and in the Buckeye Steam Laundry Company, and is also interested in zinc and mineral lands, the former near Joplin, Mo., and the latter in Arkansas.

In 1898, Mr. Heimhofer was married to Miss Rosetta Boyd, who was born and reared in Hancock County and is a daughter of the late Richard W. Boyd, whose death occurred March 10, 1910. Mr. and Mrs. Heimhofer have had two children: John Russell, who died when aged one year; and Bessie M., who was born in 1901. In politics, Mr. Heimhofer gives support to the Republican party, and has served one term in the city council. He is a member of the order of Elks.

JOHN W. SMITH, one of the representative men of Blanchard Township and well known in Hancock County, owns 300 acres of valuable land which is divided into three farms, all of the land being situated in Blanchard and Pleasant Townships. He was born in Washington Township, Hancock County, O., April 10, 1864, and is a son of Henry and Albertina (Tagler) Smith.

The parents of Mr. Smith were born in Germany and there grew up and were married. Two days after the ceremony they left their quiet homes for Hamburg, with the intention of embarking there for America. It took them two weeks to reach the city of Hamburg and six months had passed before they landed on American soil. Henry Smith soon made arrangements to rent eighty acres of land near Fostoria, O., as he could not purchase as his sole capital was represented by a coin of the value of ten cents. He had not been accustomed to hardship, as his father was a man of means in Germany, but, on account of the son marrying against the father's will, he was cut off from his inheritance. The family is familiar with the story of his successful and courageous efforts to acquire independence in the new land and of how much he was helped by the thrift and industry of the wife he had chosen.

John W. Smith attended school in Pleasant Township, north of McComb, and the Blanchard schools. He was married August 8, 1884, to Miss Nancy A. Fundum, a daughter of Henry Fundum, of Blanchard Township. After marriage they resided on the present farm which then belonged to Mr. Fundum, who spent the closing years of his life with Mr. and Mrs. Smith. After the property became his own, Mr. Smith did a large amount of improving, including the thorough draining of the land. He engages in general farming and raises a large amount of stock.

Three children were born to Mr. and Mrs. Smith, namely: Ella, who married D. A. Johnson and they live in Blanchard Township, and have two children—Clarence and Harry; Cora, who resides at home; and Arthur, who is yet at school. Mr. Smith and family belong to the Lutheran church at McComb, O. In politics he is a Democrat and has been a member of the school board for several terms and has also been township trustee, and is known as an honest and capable official. He has other investments and is a stockholder in the Farmers' Mutual Telephone Company of McComb. Perhaps no resident of this section is more

HON. JOHN MELVILLE K. LONG

kindly thought of than Mr. Smith by the poor and needy for his charities are large and the kind heart that prompts them is in sympathy with all who are in trouble.

HON. JOHN MELVILLE K. LONG, manager of Snyder's saw mill, situated in Amanda Township, Hancock County, O., and dealing in concrete and lumber and mill supplies, is one of the best known and most popular citizens of Vanlue, having been elected to the office of mayor of the place on both the Democratic and Republican tickets. He was born at Vanlue, O., June 3, 1858, and is a son of J. W. and a grandson of John Long, who was known far and wide as "Honest" John Long.

J. W. Long, father of John M. K., was born in Wyandot County, O., May 12, 1833, and died October 1, 1909. He married Wealthy Ellen Woodard, who was born July 24, 1838, and still survives. Nine children were born to them as follows: John M. K.; Minnie, who is now Mrs. Dr. Gemmell; Almeda Josephine, who is now Mrs. R. Leese, of Dunkirk; Charles Sherman, who lives at Carey, O.; Emma, who is now Mrs. Cesna of Forest; Nettie, who is now Mrs. Snook, of Delaware Township; Kenneth, who resides at Wharton, O.; Daisy, who is Mrs. McClelland, of Delaware Township; and Fred, who resides at Arlington, O.

John Melville K. Long was educated in different schools in Wyandot County and the Mt. Blanchard High School in Hancock County and later completed a course in civil engineering. He started into the mill business shortly after leaving school and became so much interested that he has continued in the same line and has greatly prospered.

Mr. Long was married to Miss Jessie F. Hammond, who was born and reared in Hancock County, and they have had three children, namely: Rex R., who was in the shoe business at Toledo, and died at the age of twenty-four years; Alice Lenola, who married John Gamel, of Cary, has one child, Ronald; and Mollie, who married H. G. Early, of Vanlue. Mr. Long is a member of the Lutheran church, while his wife attends the Methodist church. He is a 32nd degree Mason and belongs to the Blue Lodge and Chapter at Carey, O., to the Commandery at Findlay and to the Shrine at Toledo. He belongs also to the Knights of Pythias at Forest. In politics he is a Republican.

GEORGE J. HICKLE, one of the most prominent farmers in Hancock County, is the owner of 250 acres of fine farming land, upon which he lives, it being located in Sections 7 and 12, Delaware Township. He has resided on his present farm for fifty-three years, but was born in Ross County, O., April 15, 1836, his parents being Henry and Eliza (Smith) Hickle. Henry Hickle, who was born at Winchester in the Shenandoah Valley, Va., settled in Ross County when a young man, occupying a farm which he cultivated until his death in 1842, at which time his son George, our present subject, was but five years old. Mrs. Henry Hickle died at Mt. Blanchard in 1871.

When he was eleven years of age George J. Hickle accompanied his mother and brothers to Hancock County, they settling on a 160-acre farm one and a quarter miles east of Mt. Blanchard. He attended the Delaware Township schools and subsequently found employment as a clerk in a general store at Mt. Blanchard, which occupation he followed for some time. Later, however, he turned his attention to farming in which pursuit he has been very successful. Besides raising the ordinary grains and other farm produce, he possesses some of the best registered horses in the state, which have taken prizes at numerous county and state fairs. Among them are the following:

Prosper No. 44,888. Prosper is recorded by the Percheron Society of America, his recorded number being 44,888. Color and description: Dark grey; star in forehead. Pedigree: Foaled May 10, 1905; bred by E. D. Kohli, Pandora, Ohio; owned by G. J. Hickle & Sons, Mt. Blanchard, O. Sire: Rotrou 27,437 (43,665), by Jules (37,987), Viliers 13,169 (8,081), by Briard 5,317 (1,630), by Brilliant 1,271 (755), by Brilliant 1,899 (756), by Coco II (714), by Vieuxchaslin (713), by Coco (712), by Mignon (715), by Jean Le Blanc (739).

Teddy No. 43,560. Teddy is recorded by the Percheron Society of America, and his recorded number is 43,560. Color and description: Black; star. Pedigree: Foaled May 10, 1905, bred by Lonzo McClain, Lima, Ohio, and owned by G. J. Hickle & Sons, Mt. Blanchard, O. Sire: Excelsior 26,128, by Itasca 20,034, by Introuvable 16,875 (24,146), by Seducteur 8,850 (7,057), by Fenelon 2,682 (38), by Brilliant 1,271 (755), by Brilliant 1,899 (756), by Coco II (714), by Vieux Chaslin (713), by Coco (712), by Mignon (715), by Jean Le Blanc (739). In addition to horses Mr. Hickle also breeds high grade cattle, hogs and sheep.

On April 15th, 1858, Mr. Hickle was married to Miss Virginia E. Latham, of Delaware Township, Hancock County, O., a daughter of Rouzee and Nancy Latham. Her parents, who were prosperous farming people, both died in this county, Rouzee Latham attaining the remarkable age of ninety-six years. Mr. and Mrs. Hickle have been the parents of eleven children, whose record in brief is as follows:

Cordelia F., born April 3, 1859, died at the age of three years. Mary E., born January 12, 1861, and became the wife of George Riter of Delaware Township, and the mother of five children—Stanley, Fairy, Emmons, Ellen and Hazel. Alben Vinton, born December 24, 1862, married Miss Hattie Warren of Hancock County, and his children are Stanley, Anna and Ethel. Maud A., born April 13, 1865, became the wife of Edward Shoemaker, of Hancock County, and her children are George, Florence, May and Helen. Blanch A., born March 24, 1867, married Mr. O. S. Bell, of Mt. Blanchard, this county. Anna E., born May 24, 1869, married J. W. Nessbaum, of Hancock County and has three children—Helen, Mabel and Bernice. Orland E., born May 5, 1871, died at the age of twenty-six years. He married Miss Fanny Stewart of Hancock County, and they had two children—Grace and Maynard. Grace G. Hickle, the eighth member of the family, was born June 11, 1873. Harry H., the ninth member, was born January 21, 1876. Lawrence C., born July 6, 1878, and Austin, born December 16, 1880, complete the family. The last named married Miss Edith Grace Jenkins, of Delaware Township. Mrs. Virginia E. Hickle, the mother of the above mentioned children, died December 5, 1909, at the age of seventy-two years. She was a worthy woman and a member for many years of the Methodist Protestant church, to which her husband also belongs, having been a member for sixty-two years. The various members of the Hickle family are worthy men and women, of progressive citizenship and sound principles, and are esteemed and respected in the several communities in which they reside.

ALBERT J. REYCRAFT, M. D., president of the Hancock Medical Society, has been engaged in the practice of medicine at Fostoria, O., since 1895, with offices at No. 111½ South Main Street and his residence in the Hancock County side of the city. He was born in the Dominion of Canada, at Highgate, Ontario, February 22, 1862, and is a son of James and Phillicia Reycraft, the latter of whom died in 1906, but the former still resides in Highgate.

Dr. Reycraft was reared on his father's farm and attended school first at Highgate, where he graduated and went then to a more advanced school at Ridgtown, after which he went back to the farm and remained there until prepared to enter the Detroit College of Medicine, at Detroit, Mich., where he was graduated, and came then to Fostoria. He engages in a general practice but makes a specialty of diseases of women and children. Dr. Reycraft is widely known and is in the enjoyment of a very substantial practice.

Dr. Reycraft married Miss Ida A. Wigle, of Leamington, Ontario, and they have one son, James Leonard, who is a student in the Western Reserve University at Cleveland, O. For eight years Dr. Reycraft has been a member of the Hancock Medical Society and his election to its presidency is a signal mark of honor shown him by his brother practitioners. He is identified also with the Masonic fraternity.

CONRAD HILLSHAFER, one of the prominent oil producers and representative farmers of Hancock County, O., is the owner of 185 acres of valuable oil and farm land in Allen Township, his residence property of eighty acres being located about three miles north of Findlay, O. He was born October 21, 1850, in Bavaria, Germany, and is a son of Nicholas and Catherine Hillshafer.

Nicholas Hillshafer was a brewer by trade and about 1851 came alone to America. Three months after locating in Ohio, he sent to Germany for his family to come to Findlay and upon their arrival here they were greatly disappointed in not finding the father and husband. Seventeen years later it was learned through a lawsuit, that he had gone to Lawrenceburg, Ind., in search of employment, and died very suddenly while there, among strangers, thus leaving no way for his family to discover the fact of his death. His widow subsequently married David Rohrer, who was one of the hardy pioneers and large land owners of Hancock County, O. He first looked over land in this section of the country in 1827, but finding it too wild did not locate, but returned in 1833 and took up 640 acres which lay in what was later discovered to be the heart of the great oil belt of Hancock County. Had Mr. Rohrer kept the entire 640 acres until the time of his death, which occurred in 1875, he would have died a millionaire. The mother of our subject died in 1906, at the age of eighty-four years.

Conrad Hillshafer was reared in Allen Township, where his mother and step-father located when he was about five years old, and received a limited amount of schooling in the local schools. He was reared a farmer, which occupation he has always followed, and for years also dealt extensively in buying and selling stock, which work necessitated considerable traveling over various parts of the country. Mr. Hillshafer is a self-made man, is a very fluent talker, and is exceptionally well informed for one whose educational advantages have been very limited. When oil was discovered in this section of the country, Mr. Hillshafer entered actively into that industry, and was soon as widely known for his extensive oil operations, as he had formerly been as a stock dealer. Besides his home farm of eighty acres, he also owns a tract of eighty acres one mile west from where he resides, both of these farms having been owned by his step-father, David Rohrer, who entered the land from the government in 1833. Mr. Hillshafer also owns twenty-five acres east of the Perrysburg turnpike road in Allen Township, and has had over seventy producing oil wells on his three farms, having at one time forty wells in operation on the home property.

Mr. Hillshafer was joined in marriage with Miss Mary Groth, a native of Wood County, O., and a daughter of Fritz Groth, and to them have been born the following children: Ella, who is the wife of Samuel Conant, of Columbus, O.; William, who is a resident of Findlay; Conrad, who married Nancy Edelman, has one child, Fred; and Elmer, and Orin.

GEORGE R. THOMPSON, who is proprietor of the leading jewelry store at Findlay and is also an optician and dealer in optical goods, was born in West Virginia, July 23, 1854, and is a son of L. F. and Sarah E. (Latham) Thompson.

L. F. Thompson, father of George R., is now in his eighty-seventh year and is an esteemed resident of Parkersburg, West Va., where he lives retired. In early manhood he was a school teacher and later entered the employ of the Baltimore & Ohio Railroad, with which corporation he remained for fifty years. He married Sarah E. Latham, who died in 1906.

George R. Thompson was small when his parents moved to Parkersburg, this being during the Civil War, and in that city he attended school and from there went to Cincinnati and later to Springfield, O. In 1875 he came to Findlay, at that time being a poor apprentice boy, and entered the employ of George W. Kimmell, who was in the jewelry line here. He remained with Mr. Kimmell for about one year and then was with D. C. Connell until 1885, when he went into busines for himself. He is one of the experienced men in this business and has been connected with the jewelry trade here for thirty-five continuous years. When he first came to this city he had little hope of becoming what he is, one of the representative and substantial business men of Findlay.

Mr. Thompson was married to Miss Elta B. Tate, of Findlay, O., and they have two children: Marshall B., who is associated with his father; and Kenneth M. Mr. Thompson and family are members of the First Presbyterian church. He is identified with the Masons and the Elks. He is not active in politics but has high standing as a citizen and gives hearty support to all movements affecting Findlay's substantial development and the welfare of its people.

S. C. WALKER, owner of 123 acres of fine farming land in Section 18, Delaware Township, upon which he has lived for seventeen years, was born in Shelby County, O., September 25, 1858, son of James and Melvina (Eltzroth) Walker. Our subject's father was born in Ireland and came to Ohio at the age of twenty-one years, soon after becoming identified with railroad work, at which he continued until reaching middle life. He subsequently moved to southern Indiana, where he bought a farm, upon which he resided until his death, at the age of seventy-three years. His wife, who was a native of Ohio, died when her son, the subject of this sketch, was a babe of four months, at Sidney, O.

S. C. Walker in his boyhood attended school in Delaware Township, and subsequently began work on a farm in that township, the property being owned by his uncle, by whom he was employed. In 1893 he became its owner by purchase, and has since put in all the present standing improvements, including the house, barn and fences. Here he carries on general farming and stock raising very profitably, and is known as one of the prosperous and enterprising citizens of the township.

Mr. Walker was married in 1881, to Miss Laura Wolford, a daughter of Hamson and Barbara (Trackler) Wolford, prominent farmers of Delaware Township. Hamson Wolford lost his life fighting in defense of the Union, when his daughter Barbara was but a small child. Of this, Mr. Walker's first marriage, two children were born—James Earl and E. Guy. The former, James E. Walker, served forty-nine months in the United States Navy. E. Guy Walker, born March 24, 1887, was accidentally killed on a farm near his father's place, on January 29, 1906.

In March, 1888, the subject of this sketch was married to his second wife, who was Miss Alice Trackler of Blanchard Township, a daughter of J. A. and Anna (Poorman) Trackler, who were farming people. Of Mr. Walker's second union four children have been born, namely: Clarence Ray, born January 20, 1889, who died as the consequence of having been kicked by a colt on his father's farm, April 23, 1908; Ida May, born February 15, 1891; Harry Wayne, born October 26, 1893; and Stanley Eugene, born June 21, 1908. Mr. Walker and his family are supporters of the Hope Chapel in Delaware Township. He is also a member of the Masonic Lodge No. 519 at Mt. Blanchard. He served as township trustee for one year and was assessor of Delaware Township from 1890 to 1895, being elected on the Republican ticket. For a number of years also he was a member of the school board of Delaware Township, in all these various positions proving a capable official and rendering good public service that was appreciated by his fellow townsmen.

DAVID B. KAGY, township trustee and one of the progressive farmers of Allen Township, resides on a farm of fifty-seven acres located about one-half mile east of Van Buren, O., and was born June 16, 1851, on his father's farm about one and a half miles east of Van Buren, O., a son of Samuel and Hannah (Baker) Kagy. Our subject's parents came to Hancock County from Fairfield County, in 1847, and settled on a farm in Allen Township.

David B. Kagy was reared on the home farm in Allen Township and received his early instruction in the local schools, later entering Mt. Union College, at Mt. Union, O., where he spent three years. After completing his education, Mr. Kagy taught school for fifteen years, teaching four terms in the Van Buren school, and also taught summer school terms several years, but usually spent the summer months in farming. In 1884, Mr. Kagy bought his present farm of fifty-seven acres, which is located on the Ridge Road, and has lived here continuously since that time.

Mr. Kagy was married in 1879 to Elizabeth H. Higgins, a graduate in the class of 1879 at Mt. Union College, whom he met while a student there himself, and whose father, Rev. Thomas J. Higgins, had previously been pastor of the Methodist Episcopal church of Mt. Union. Mr. and Mrs. Kagy have one son, Emmerson G., a bright lad of ten years. The family are members of the Presbyterian church of Van Buren of which Mr. Kagy is now serving as congregational clerk. Mr. Kagy is a Democrat and in the fall of 1907 was elected trustee of Allen Township, and reelected to that office in 1909, his present term expiring January 1, 1912. He has also held other township offices, having previously served several terms as trustee and clerk of Allen Township.

HENRY STOUGH, whose possessions include 139 acres of valuable farming land situated in Sections 33 and 34, Cass Township, Hancock County, O., was born April 12, 1844, in Ashland County, O., where his father owned a small farm. His parents were George and Catherine (Gearheart) Stough.

George Stough was born in Pennsylvania and came to Ohio with his father, Moses Stough, who settled and lived in Ashland County, O., into old age but died at the home of his son George Stough, in Hancock County, when he was eighty-three years old. George Stough was married in Ashland County, to Catherine Gearheart, whose parents were also from Pennsylvania, and in 1853 moved with his family to Hancock County, securing land in Allen Township on which stood a small log cabin. In the following fall he built an addition which served until the present handsome and commodious brick residence took its place. George Stough cleared the land and burned the brush off where his buildings later covered a large space. He bought first 160 acres to which he subsequently added eighty acres and on this place he passed the remainder of his life, dying at the age of eighty-three years, having survived his wife. Ten children were born to them, eight in Ashland County and two in Hancock County. The family record is as follows: Eliza Jane, who is the widow of Samuel Wagner; Daniel; Mary Ann, deceased, who was the wife of H. B. McCracken; Henry; Christopher; Susanna, deceased, who was the wife of Fred Weiler, also deceased; Sarah, deceased, who was the wife of George Nelson; Catherine, deceased, who was the wife of John Taylor; Elizabeth, deceased, who was the wife of John Bly; and Amelia, deceased, who was the wife of William Shafer, also deceased.

Henry Stough was nine years old when his parents came to Hancock County, reaching here on his birthday. He was a bright, inquisitive boy and when he started to school found the schoolhouse a log structure in the woods not far from his father's cabin, and on its old slab benches he passed many a winter day later on. He was soon called on, however, to help in clearing up the land, his first work in this line being the watching of the brush heaps in burning, to see that no conflagrations started. Later he became his father's most valuable helper in farming and stock raising.

HON. JOSEPH R. KAGY

In December, 1865, Henry Stough was married to Miss Susanna Shafer, a daughter of Josiah Shafer, an old resident of Hancock County. Mrs. Stough became the mother of two children—Henrietta and William, and died in 1902. Henrietta was born in 1866 and died in June, 1905. She married Edward Wachtel and they had two children: Merle and Corinne. The latter was reared by her grandfather to the age of fifteen years and was a student in the Findlay High School when her death occurred in February, 1910. William, the only son of Mr. Stough, who was born in November, 1874, died in 1892.

Mr. Stough moved into a log cabin on his present farm in the fall of 1867, this farm being the old Shafer home place, and in 1875 he erected his present comfortable residence. He carries on general farming. In politics, as was his father, he is a Democrat and he has served as a justice of the peace and as land appraiser in 1900 and 1910.

JOSEPH OEHLSCHLAGER, director of Public Service, at Findlay, O., has been a resident of this city since 1888 and as business man and public official is widely known. He was born in a village in New York, September 14, 1855, and is a son of Martin and Amelia O. Oehlschlager, the latter of whom died when he was one year old, in New York, and the father at a later date in Iowa.

Mr. Oehlschlager was young when his father took him to Iowa and he was reared and attended school there and prior to coming to Findlay, was engaged in a grocery business in that state. After reaching this city he engaged in the liquor business in which he continued until 1902, when he became interested in the oil business and remained so engaged until in the fall of 1907, when he was elected on the Republican ticket to membership on the Board of Public Service and served as president of that body until January 1, 1910, when, under the new code he was appointed director of the Public Service by Mayor Groves. He is one of the city's substantial as well as reliable citizens. In 1895 he bought the property at No. 331 South Main Street, which is now occupied by the Edwards Shoe Company, and has other interests. Mr. Oehlschlager was married in Iowa to Miss Amelia Braumberger. He is a member of the Elks and the Maccabees.

HON. JOSEPH R. KAGY, formerly mayor of the city of Findlay, and for many years a public official of Hancock County, during which time he capably filled many offices of responsibility, has been engaged in the real estate and insurance business at Findlay, for over a decade. He was born December 21, 1842, in Fairfield County, Ohio, and in 1847 was brought to Hancock County by his parents, and from that time until the present he has been identified with the interests of this section of Ohio.

When nineteen years of age, Mr. Kagy began to teach school during the winter seasons, passing his summers in healthy farm work; and for about nine years he had charge of the public schools of Van Buren. During his many years of residence in Allen Township, Mr. Kagy proved himself an active and useful citizen, and after serving a number of terms as township clerk, assessor and treasurer, in 1877 he was elected auditor of Hancock County, being re-elected in 1880. After the close of his second term, he served for almost two years as deputy auditor. When Hon. W. L. Carlin, then mayor of Findlay, was elected to the State Senate, Mr. Kagy, who was then serving as a member of the city council of Findlay, was elected by the council to fill out the unexpired term of Mayor Carlin, which he did to the entire satisfaction of his fellow citizens. The duties of his other public positions occupied a large part of his time, these offices including membership on the board of county school examiners, and the positions of assistant clerk of the State Senate, deputy state superintendent of insurance, and roll clerk in the Pension Department at Columbus. Since 1901, when he was put forward by the Democratic party as its candidate for state senator, Mr. Kagy has not been as active in politics as formerly and thus has found more time to give attention to his own business affairs. From 1886 to 1889, he was engaged very successfully in the oil and gas business, but since 1898 he has been mainly interested in fire insurance and realty, and in these lines is a representative business man of this city. He has offices in the Marvin Block and is agent for fire, tornado, and plate glass insurance, representing the following standard companies: the Aetna Insurance Company, of Hartford, Conn.; the Phoenix Insurance Company, of Brooklyn, New York; the Royal Exchange Assurance, of London, England; the Sun Insurance Office, of London, England; Lloyd's Plate Glass, of New York; and the Citizens, of St. Louis, Missouri.

At Van Buren, Ohio, on January 21, 1864, Mr. Kagy married Miss Catherine M. Zarbaugh, and the survivors of their family of six children are: Nora B., who resides at home and is associated with her father in the office (she is prominent in the Rebecca branch of Odd Fellowship, and is past president of the Rebecca Assembly of Ohio); Mary E., who is the wife of Dr. E. B. Jacobs, residing at Chicago, Ill.; David C. D., who is an attorney and a well known educator in Hancock County; and J. Rodney, who is engaged in the practice of dentistry, at Chicago, Ill. The family home is situated on Perrysburg Road. Mr. Kagy is an Odd Fellow and an Elk.

P. McDOWELL, who resides on his well improved farm of ninety-three acres, which is situated in Sections 4 and 9, Union Township, Hancock County, O., came here in 1877 and this has been his continuous home, He was born in Licking County, O., February 16, 1832, and is a son of John and Eliza (Ackley) McDowell.

John McDowell was a native of Ohio and was a farmer all his life. In 1836 he moved from Licking to Putnam County, where he died in 1842. He married Eliza Ackley, who was born in New York, in 1812, and died in Putnam County, in 1900. They were well known and highly respected people.

P. McDowell obtained his education in boyhood in the country schools but early went to work as he was only ten years old when his father died. When he reached manhood he married Miss Nancy E. Harris, who was born in Licking County, O., in 1833, and they began housekeeping in Putnam County but moved to Hancock County and settled on the present farm in 1877. They have had six children, namely: Lorenzo, who died in Putnam County in 1877; Ansel, who died at the age of four weeks; Mary, who married a Mr. Rother, of Hancock County, and they have six children—Claude, Olive, Clare, Arby, Guy, and Alma. Lida, who married Sheridan Wilkins, of Putnam County; Delbert, who married Miss Allie Aurand, resides on his farm in Union Township, they have one son, Hollis age eight years; and Clara, who resides at home. The mother of the above family died here in 1897, when aged sixty-four years. She was a loving wife and mother and a valued member of the Methodist Episcopal church at Benton Ridge. Mr. McDowell is also connected with this church and for a number of years was the superintendent of the Sunday-school.

General farming and stock raising are carried on by Mr. McDowell and he has always met with satisfactory returns. It is conceded that this is the best grain farm in Union Township. At different times he has made improvements, has substantial buildings, plenty of fencing and excellent accommodations for his various kinds of stock.

PETER A. MATHEWSON, who carries on general farming and has a reputation for raising especially fine road horses, owns 160 acres of valuable land situated in Section 25, Orange Township, Hancock County, O. Mr. Mathewson was born in Van Buren Township, Hancock County, May 1, 1882, and is a son of Dr. W. R. and Flora (Bender) Mathewson.

Dr. W. R. Mathewson is a well known veterinary surgeon and horse dealer and has been a resident of Bluffton, O., since September, 1900. He married Flora Bender, a native of Orange Township, who, like himself had neither brother nor sister. They had but two children born to them: Lottie and Peter A.

Peter A. Mathewson obtained his education in School District No. 7, Orange Township, and then began to assist his father, having always resided on a farm with the exception of a short period following his marriage, when he lived at Bluffton. In association with his father he has greatly improved this farm, about 102 acres of which is in first class condition, the soil mellow and fertile and very productive. They carefully drained the land and it is one of the best cared for farms in the township. The farm buildings are substantial and have been remodeled and made very presentable. Mr. Mathewson is an enterprising and practical young farmer and horseman and success is attending his efforts.

Mr. Matthewson married Amanda Bame, who is a daughter of George Bame, of Williamstown, and two children have been born to them: Kenneth G. and Byrl. The former died April 15, 1904, and was buried at Hassam Cemetery. The latter was born June 12, 1902, and is a bright student at school. Mr. Mathewson calls himself an Independent Democrat in his political views. He is a member of the order of Modern Woodmen of America and attends the lodge at Bluffton.

REUBEN B. KEERAN, M. D., physician and surgeon, with offices at No. 315½ South Main Street, Findlay, O., has been in active practice in this city since 1886 and is numbered with her leading professional men. He was born near Burgoon, Sandusky County, O., February 20, 1853, and is a son of Nathaniel and Eliza (Linch) Keeran.

Nathaniel Keeran, who was a blacksmith and farmer, came to Hancock County in

1866, and settled on a farm near McComb, on which he continued to reside until his death, in 1879. His widow survived until 1886.

Reuben B. Keeran obtained his education in the country schools and a select school at Findlay and thus prepared himself for teaching, and afterward taught three terms in the country districts, one term at Findlay, and two terms in Clark County, Ill., where he had gone in 1876. Prior to this move, however, he had read medicine with Dr. Jesse Watson, at McComb, Hancock County, and later entered the Cincinnati Eclectic Medical College, from which he was graduated in 1876. He immediately engaged in practice in Clark County but his health failed and instead of practicing he taught school for a time and rested a year, when he resumed medical practice and remained in Clark County, until 1886, when he located permanently at Findlay. Dr. Keeran is a member of the Northwestern, the Ohio State and the National Medical Societies. He married Miss Annie C. Fahrer, of Lancaster, O.

WILLIAM P. HAMMOND, who conducts the only bakery at Rawson, O., has been in business here for the past four years and has become one of the representative citizens. He was born at Mt. Blanchard, Hancock County, O., May 15, 1851, and is a son of Thomas and Mary (Missmore) Hammond.

Thomas Hammond was born on a farm in Jackson Township, Hancock County, and for a number of years was an acceptable school teacher through Delaware and Jackson Townships. He died at Mt. Blanchard in 1875. He married Mary Missmore, who was born in Pennsylvania, on the farm of her parents. She survived until 1901, her death taking place in Delaware Township, Hancock County.

William P. Hammond attended the schools of Delaware Township and later became a teacher, for a number of terms teaching in Jackson and Amanda Townships. He has always taken an active part in politics, being identified with the Democratic party, and for eight years served as clerk of Amanda Township, being first elected in 1880, and for one year was also township assessor, elected to this office in 1890. In the performance of public duties he has been honest and efficient and numbers his friends, both political and personal, by the score.

In 1875, Mr. Hammond was married to Miss Laura Lee, who died in 1904 at Vanlue, O., aged thirty-five years. They had three children: Harry, Cora and Trude. Harry married Gertrude Corbin, of Big Lick Township and they have one daughter, Helen. Cora married Charles Kear, of Wyandot County, and they have two children: Russell and David. Trude married Robert Earley, of Amanda Township, and they have one son, Clarence. In 1905, Mr. Hammond was married to Miss Emma Shull, a daughter of Franklin Shull, a farmer in Amanda Township. Mr. Hammond and family belong to the United Brethren church at Rawson. He is a member of Lodge No. 353, I. O. O. F., at Vanlue, and for the past ten years has been a member of Lodge No. 710, Knights of Pythias, at Vanlue.

CHRISTOPHER STOUGH, owner of 160 acres of productive and highly cultivated farm land in Allen Township, Hancock County, O., was born August 1, 1846, on a farm about three miles northeast of Ashland, Ashland County, O., and is a son of George and Catherine (Geirhart) Stough.

In 1853 Christopher Stough came to Hancock County with his parents, who settled on land in the extreme southeastern part of Allen Township, where the father died June 9, 1898. The mother died in 1893. Here Mr. Stough was reared and educated, attending the local schools, and has always followed farming and stock raising. The first two years of his married life were spent on the Eckert farm in Cass Township, which was originally owned by his wife's grandfather Eckert, and the three following years were spent on his father's farm in Allen Township. Since 1873, Mr. Stough has been living on his present farm, eighty acres being located in Section 32, and eighty acres, which corner to the southwest, being located in Section 31.

Mr. Stough was united in marriage with Miss Maria Eckert, a daughter of Sullivan Eckert, of Marion Township, and they have had three children: George, who is president of the Allen Township School Board, lives on a farm adjoining that of his father; Charlie J., who resides on the old Eckert farm in Cass Township; and Guy, who figures prominently in the oil industry, resides on Center Street, Findlay, O. Mr. Stough is an adherent of the Democratic party, politcally, and served eight years as trustee of Allen Township, his term expiring in 1907.

O. H. SAUNDERS, M. D., physician and surgeon at Findlay, O., and a representative member of his profession, was born at Benton Ridge, Hancock County, O, March 22, 1864, and is a son of Thomas J. and Hannah L. (Ballard) Saunders.

Thomas J. Saunders was born in Fairfield County, O., and came to Hancock County when twelve years old, with his father, Jacob G. Saunders, who established himself in the shoemaking trade at Benton Ridge. Thomas J. Saunders learned his father's trade and he also taught school and after coming to Findlay, where he died in 1901, he conducted the Saunders Hotel for a number of years. His widow survives.

O. H. Saunders was reared at Benton Ridge and attended the public schools there, subsequently becoming a teacher and for nine years prior to 1887, when he accompanied his parents to Findlay, he taught school in Hancock County. About that time he entered the Ohio Medical College, now the University of Cincinnati, and was graduated there in the class of 1891, when he returned to Findlay and engaged in medical practice here for one year, moving then to West Indepedence, where he continued to practice for eight years. In 1900 he returned to Findlay and established his office at No. 315½ South Main Street. Dr. Saunders is a member of the Hancock County, the Ohio State and the National Medical Societies and keeps thoroughly abreast with the times in the advancement of medical science. He is an active citizen and in 1901 was elected a member of the Findlay School Board and since 1907 has been clerk of this body.

Dr. Saunders was married to Miss Anna E. Winbigler, a daughter of William Winbigler, of Maryland, and they have two children: Ralph Thomas and Marie L. He is fraternally affiliated with the order of Ben Hur and the Maccabees.

EDWARD GEORGE, M. D., who has been engaged in the practice of medicine at Van Buren, O., since 1876, was born March 18, 1850, in Mercer County, Pa., and is a son of Jonathan and Elizabeth (Harlow) George. The father of our subject was a carpenter and cabinetmaker by trade and about 1855 came to Hancock County, O., and followed his trade at Benton Ridge during the remainder of his active life. He died in Findlay, O., in 1901, and his wife died in 1900.

Edward George was reared at Benton Ridge, O., where he obtained his early education in the common schools and also taught one year. He then began reading medicine with Dr. T. C. Ballard, formerly of Benton Ridge, but later of Findlay, and after studying with him one year and six months, entered the Medical Department of the University of Michigan at Ann Arbor, where he spent one year. He then entered the Medical College at Indianapolis, Ind., and graduated from same with the class of 1876, and has since been successfully engaged in the practice of his profession at Van Buren, Allen Township, Hancock County, O. Dr. George owns a fine tract of farming land in Allen Township. He is a member of the American, Ohio State, Hancock County, and the Northwestern Ohio Medical Societies, and is affiliated with the Knights of Pythias. His religious connection is with the Presbyterian church of Van Buren.

Dr. George was united in marriage in 1875 with Miss Esther Whistler, a daughter of Samuel Whistler, a miller and farmer of Benton Ridge, O.

NORMAN HUFFMAN, a prominent farmer and stockman, owning 160 acres of valuable land situated in Section 26, Cass Township, Hancock County, O., has oil and financial interests in this section and is a representative business man. He now enjoys one of the fine residences of the township, but he was born June 3, 1845, in a round log house that stood on his father's farm in Washington Township, Hancock County. He is a son of William and Margaret (Ruff) Huffman.

William Huffman came to Hancock County in 1844 from Portage County, O., and located first on a tract of eighty acres, situated in Section 7, which he later sold and bought sixty-one acres in the same township. He died on that place a comparatively young man although he had a family of ten children. He married Margaret Ruff, who died in 1904, being then more than eighty years of age. Hiram, the eldest son, was a member of Co. A, 49th O. Vol. Inf., and died during the Civil War. Joseph, who was a member of the same regiment, survived the entire period of strife and now resides in Michigan. Christina is the widow of David Caldwell. Alvira is the wife of Reason Crozer. Mary is the widow of John Wineland. The others survive: Jefferson and Addison, twins; George, Jeremiah and Norman, the last named being the fourth in order of birth.

Norman Huffman grew to manhood in Washington Township. His father died while his older brothers were in the army and for this reason his own school period was shortened as he had to take charge of the farm under these conditions. He remained with his mother until his own marriage and by that time some of the younger sons were capable of managing her interests. He purchased his present farm from V. E. Baker and while the brick

EDWARD G. HERSH, M. D.

residence was standing, he found plenty of improving to do in other ways and a large amount of buildings and sheds to erect for his cattle, as he makes a great specialty of all kinds of stock. He gives attention only to the best strains, breeding and handling Percheron horses, Shorthorn cattle and Chester White hogs. He has ten producing oil wells which are a steady source of income. He is interested also as a stockholder in the Arcadia Bank at Arcadia, O.

Mr. Huffman was married the first time to Mary Anderson, who died after the birth of seven children, namely: Morris, who is deceased, married Lola McCracken, also deceased; William E., who married Etta Mosier, has four children—Frances, Helen, Donald and Pearl; Laura, who is the wife of Ballard Nelson; Ephraim and Arthur, twins, the former of whom married Lucy Taylor and they have one child, Lloyd; Bertha, who is the wife of Reily Canfield, and they have two children—Orpha and Fay; and Della, who is the wife of Edward Walters and they have one child, Florence. Mr. Huffman's second marriage was to Mary A. Taylor, a daughter of George Taylor, formerly an old resident of Hancock County, now of Indiana. In politics, Mr. Huffman is a Democrat and he has served as school director, township trustee and in other offices. He is identified with Lodge No. 421, Knights of Pythias, Arcadia, O.

EDWARD G. HERSH, M. D., who commands a large medical practice at McComb, O., where he is a leading citizen and has property investments, was born at Grand Rapids, Wood County, O., January 29, 1865, and is a son of Henry and Hannah (Bell) Hersh.

Henry Hersh was born in Holmes County, O., in 1830 and died in Wood County, in 1890. Prior to 1860 he moved to Wood County and there engaged in farming. He served as a soldier in the Union army during the Civil War and was identified with a post of the Grand Army of the Republic. He married Hannah Bell, who was also born in Holmes County and still survives, being now in her seventy-eighth year. Two of their family of children are deceased, but the following are living: Maggie J., who is the wife of J. B. Gunday, of Toledo; John A., who resides in Cleveland; George E., who is a lumber merchant at Grand Rapids, O.; W. H., who is a graduate of the College of Physicians and Surgeons at Chicago, where he is engaged in medical practice; Arthur B., who is engaged in farming near Grand Rapids; and Edward G. In politics, Henry Hersh was a Republican and both he and wife were members of the United Brethren church.

Edward G. Hersh obtained his education in the common schools and the High School at Grand Rapids and then took a scientific course in the Middlepoint Normal School. After teaching school for four terms he entered the Cincinnati College of Medicine and Surgery, which is now known as the University of Cincinnati, and was graduated in the class of 1890. In the same year he came to McComb and has identified himself with the people and interests here, in 1900 completing the erection of his beautiful modern residence. He is a member of the leading medical organizations of the country, including the American Medical Association, the Ohio State Medical Society, the Northwestern Ohio Medical Association, the Hancock County Medical Association, and the National Association of Railway Surgeons. He is special surgeon for the C. H. & D. Railroad and the Nickel Plate Railroad.

On October 6, 1890, Dr. Hersh was married to Miss Cora Kimberlin, who was born and reared at Grand Rapids, a daughter of Jacob and Sabina Kimberlin. They are members of the Presbyterian church. Dr. Hersh is a 32nd degree Mason, a Knight of Pythias, and belongs also to the Elks. In his political views he is a Republican.

JOHN C. FIRMIN, proprietor of Firmin's Drug Store, at Findlay, O., has been owner of his present business since the fall of 1890. He was born at Wilbraham, Mass., October 5, 1857, and is a son of F. B. and Mary (Chapin) Firmin.

F. B. Firmin died in Massachusetts, in 1881, after which his widow came to Findlay, where her death occurred in 1903. The name of Firmin has been a prominent one in medical and drug circles of Findlay. The late Dr. Lorenzo Firmin, an uncle of John C. Firmin, in his day was one of the eminent physicians of this city. Dr. F. W. Firmin, a brother of John C., is associated with his son, Dr. John M. Firmin, in medical and surgical practice at Findlay. Dr. Lorenzo and Dr. F. W. Firmin were already established at Findlay when John C. Firmin came here in 1877.

John C. Firmin was twenty years old when he came to Findlay and started to learn the drug business with John Decker, who was then the proprietor of what is now known as the Central Drug Company. After serving the required apprenticeship, Mr. Firmin entered Washington College, at Washington, D. C., where he was graduated in 1883, with the degree of Phar. D. He then returned to his native state and was engaged there in connection with the drug business for seven years, during the larger part of the time in the city of Worcester. In 1890 he returned to Findlay and bought the old Huber & Burns store and has continued in business here ever since. He carries a full line of drugs, sundries, candies and cigars, together with all the specialties found in a modern drug store and has probably the most complete establishment in this line in Hancock County.

Mr. Firmin has long been recognized as one of the representative and public spirited citizens of Findlay. He served continuously as city treasurer from 1903 until January 1, 1910, being elected to that office on the Republican ticket. He is a member of the Masonic fraternity. Mr. Firmin has never married.

LUKE EDWARDS, a citizen of Mt. Cory, O., to which pleasant town he came in 1907, for ten years previously resided on a farm of eighty acres near the town, and is well known all through this section. He was born at Liverpool, England, May 7, 1852, and is a son of Thomas and Anna (King) Edwards. The parents of Mr. Edwards were born in Monmouthshire, England. They came to America and settled first at Richmond, Va., and later in Medina County, O., and lived also at St. Louis, Mo., the father in all these places working as a heater in a rolling mill. He and wife both died at Peru, Ind., the father in 1907 and the mother in 1908.

Luke Edwards was mainly educated in the schools of St. Louis. During a large portion of his business life he has been interested in the oil industry, for some years being in the employ of the Standard Oil Company, near Findlay. At present he owns a lease of 1,000 acres of oil land at Fort Recovery, O., and has thirty producing wells.

In 1873, Mr. Edwards was married to Miss Sarah Evans, a daughter of John and Martha (Smith) Evans, the former of whom was a roller in a tin plate mill in England, where he died in 1870. Mrs. Edwards came to America in 1870, with her brother, Anthony Evans. Their grandmother, Sarah Anthony, was the daughter of a very prominent and wealthy man in England. Mr. and Mrs. Edwards went to housekeeping at first in St. Louis. They have three children: John, who is a train repairer, married a Mrs. Metzler, of Chicago, and they have two children—Preston and Wallace; Gordon, who married Ollie Shine, of Mt. Cory, has two children—Treva and Waneta; and Lottie Doris, who is the wife of Fred Fisher and they have one daughter, Beatrice.

ADAM BOWER, general farmer and highly respected citizen of Orange Township, Hancock County, O., where he owns a farm of forty acres, situated in Section 12, was born in Franklin County, O., May 17, 1854. His parents were Jacob and Catherine (Fendrick) Bower.

Jacob Bower was born in Germany and was twenty-seven years of age when he came to Franklin County, O., where he soon after was married to Catherine Fendrick, also a native of Germany. They continued to live in Franklin County until after the birth of three children—Mary, Elizabeth, and Adam—and then moved to Van Buren Township, Hancock County, taking up forty acres of land on the western township line. Later Jacob Bower sold that land and bought eighty acres south of Jenera, also in Van Buren Township, and there the rest of the children were born — Catherine, Henry, Maggie and Barbara. Jacob Bower lived there into old age, his death occurring October 31, 1909, when he was ninety-one years old. His burial was in the cemetery attached to the Lutheran church of Eagle Creek of which he was a member. His widow still survives and lives on the homestead.

Adam Bower had attended school for one term when the family moved from Franklin County although he was only five years old at the time. He continued at school, during the winter seasons, until he was eighteen years of age, devoting his summers from boyhood to farm work. After he married he settled on his present property and he has made all the excellent improvements, erecting the substantial buildings and attending to the draining of the land. He also had a large part of the farm to clear and still has five acres in valuable timber. As far as he knows, his land has neither oil nor gas as he has never thought it advisable to make tests.

Mr. Bower was married in Van Buren Township to Miss Catherine Essinger, a daughter of John and Elizabeth Essinger, and they have had five children: Andy, Elizabeth, George, Lucinda and Henry Edward, the last named having died when five months old. Mr. Bower and wife are members of the Evangelical Lutheran church of Eagle Creek. He votes the Democratic ticket.

JACKSON H. CRAWFORD, chief of the Findlay police force, has been a member of the organization since April 20, 1902, and has occupied his present responsible position since August 1, 1909. He was born in Warren County, Pa., May 27, 1865, and is a son of Patrick Henry and Margaret (Downs) Crawford. Henry Crawford was a railroad man for some years but now is engaged in farming in Shelby County, O., where both he and wife reside. In 1868 they moved to Wadsworth and later to Mansfield, O., and still later to their farm.

Jackson H. Crawford was reared at Mansfield and attended school there and then went into the oil fields and for thirteen years was in the employ of E. Wanamaker, the large oil producer. He was twenty-three years old when he came to Findlay, March 1, 1888, and was in the oil industry until he became a member of the police force as indicated above. Faithful and efficient service brought about promotion and in the summer of 1909 he was appointed chief of the department by Hon. J. B. Walker, mayor of Findlay. His administration has been an effective one and he commands the confidence of the city. Chief Crawford was married at Shelby, O., to Miss Laura E. Barga, and they have two children: Verl D. and Myrtle.

WILLIAM H. FALK, postmaster at Mt. Cory, O., and proprietor of a general store, was born in Adams County, Ind., and is a son of Sylvanus and Margaret Falk.

The parents of Mr. Falk were born in Pennsylvania. When the father was small his parents came to Hancock County when the present site of Mt. Cory was covered with a dense forest growth. The grandfather secured eighty acres of Government land, which Sylvanus Falk assisted him to clear. He continued to live on the farm until he went for a time to Indiana, where he worked in a tannery. He then came back to Hancock County and now resides retired at Mt. Cory. He married a member of an old Pennsylvania family that came to Fairfield County, O. She died at Mt. Cory in 1906.

William H. Falk was reared in Union Township, Hancock County, where he attended school. After his marriage he moved to Mt. Cory and has become one of the substantial business men of the place. He owns the largest business block in the town, which he has completed within the past six years and his general store leads all other enterprises of its kind in volume and quality of stock. He handles groceries, shoes, hats, caps and dry goods, and since April 1, 1906, he has been postmaster.

In 1892, Mr. Falk was married to Miss Sophia Fox, whose parents were farming people residing one and one-half miles north of Rawson, O. The mother still resides on the homestead but the father died in 1902. Mr. and Mrs. Falk have six children:: Marquerite Levon, Dorothy, Winona, Donald and Elizabeth. In politics, Mr. Falk is a Republican.

EDWARD BOUTWELL, who carries on general farming and stock raising on his valuable farm of 100 acres, which is situated in Section 14, Orange Township, Hancock County, O., was born in this township, March 19, 1866, and is a son of Edwin and Rebecca (Elder) Boutwell.

Edwin Boutwell was born in the State of New York and in boyhood accompanied his parents to Coshocton County, O., where he was educated in the schools of that day, mostly of the pioneer type. He then came into Hancock County and soon married Rebecca Elder, of Mt. Blanchard, a daughter of Robert Elder. They settled in Orange Township and there eleven children were born to them, three of whom are living. Edwin Boutwell was one of the early settlers and did the most of the clearing of his land. Later in life he moved to the State of Washington in search of health and lived there until his death, in his seventy-fifth year. His wife died when aged seventy-two years and was buried in the Hassam Cemetery, Orange Township. They were members of the Riley Creek Baptist church.

Edward Boutwell has almost always lived on his present farm and as soon as his school days were over began to give his father much assistance. He spent the first year after his marriage in Van Wert County and then returned to Orange Township and secured the southeast quarter of the homestead. This part of the estate he has greatly improved, having erected all the substantial buildings now standing and having done all the underdraining and ditching. The first wild-cat well drilled in Orange Township was on his farm and some oil and gas were developed. He has six acres in very valuable timber.

Mr. Boutwell was married in 1885. to Miss Eliza Zarabaugh, a daughter of Peter Zarabaugh, of Orange Township, and they have had eleven children: Charles H., Burley, William, Arthur, George, Luella, Ward, Etta, Mabel Cloyce and Ruth. The family attend the Baptist church. In politics Mr. Boutwell is a Democrat as was his father before him.

FRED E. ANDERSON, V. S., with office at No. 130 East Crawford Street, Findlay, O., entered into the practice of his profession in this city in 1887, and has built up a large business in this section. He was born at Carey, Wyandot County, O., April 1, 1864, and is a son of Isaiah J. and Elizabeth (Stauffer) Anderson.

Isaiah J. Anderson was born and reared at Fostoria, O., and was a son of James Anderson, a pioneer there, who once owned several hundred acres of land and conducted one of the early stores of that place. From Fostoria, Isaiah J. Anderson moved to Carey, in Wyandot County, where he conducted a store until 1869, when he moved onto his farm. He died in July, 1905, having survived his wife since 1882.

Fred E. Anderson was five years old when his parents moved on the farm and he remained there until he was nineteen years of age. While he was never particularly interested in the tilling of the soil, from boyhood he liked animals and was able to control them and when the time came for him to choose a pursuit and profession, he decided to be a veterinary surgeon and to this end became a student in the veterinary college at Toronto, Canada, where he was graduated in 1886. He practiced at Carey from April 1, 1886, until January 1, 1887, when he came to Findlay. He stands at the head of his profession in Hancock County.

Dr. Anderson married Miss Laura E. Moses, of Sandusky County, and they have two children: Harry T. and Gertrude O. He recently purchased a beautiful residence at No. 219 East Sandusky Street. He is identified with the Masonic fraternity.

HERBERT S. SOLT, general farmer and owner of eighty acres of well improved land which is situated in Section 21, Eagle Township, Hancock County, O., seven and one-half miles southwest of Findlay, on the Rawson road, was born on this place, March 9, 1868. His parents were Peter and Henrietta (Cloud) Solt.

Peter Solt was born in Fairfield County, O., as was also his wife, and they came to Eagle Township in the fall of 1855 and settled here when for miles and miles around there was nothing but forest. Peter Solt engaged in stock buying for many years and made many trips to New York to find a market, driving his stock himself. He lived to see many changes of all kinds, his death occurring June 20, 1908. His wife was a daughter of Mordecai Cloud, who was a prosperous farmer in Fairfield County. Mrs. Solt survives and lives with her son, D. B. Solt, at Rawson, Ohio.

Herbert S. Solt obtained his education in the township schools and from boyhood has been busy on the farm on which he was born. He carries on a general farming line and raises considerable stock, each year having hogs, sheep, horses and cattle to sell. Since coming into possession of the farm he has done quite a large amount of improving, building a commodious and comfortable farm house and also a substantial barn and he has also put down enough tile to ensure proper drainage. Mr. Solt is a progressive farmer and carries on his various operations according to modern ideas.

On May 18, 1909, Mr. Solt was married to Miss Glenn Treece, a daughter of Isaac and Amy Treece, and they have one child, Rena Lucile. Mrs. Solt was a teacher prior to her marriage and taught in Van Buren Township from 1907 until 1908 and later taught one term in Eagle Township, and was very highly esteemed in both neighborhoods. Mr. Solt takes no very active interest in politics but he is a fair-minded man and his neighbors know that he may be depended upon to support all measures which promise to be beneficial to his section.

GEORGE FRANKLIN VAN EMAN, who has been postmaster of Van Buren, O., since February 6, 1908, when he succeeded G. S. Brushwood, was for many years engaged in agricultural pursuits in Cass Township, Hancock County, O. He was born August 30, 1863, on a farm in Cass Township, and is a son of Joseph Cooper and Mary E. (Hollingshead) Van Eman.

Joseph Cooper Van Eman was born in Greene County, Pa., and at the age of thirteen years came to Hancock County, O., with his parents, who located on a farm six miles west of Findlay in Blanchard Township. Here he was reared to maturity and during his early manhood taught school a few terms, and engaged in the mercantile business, but spent his later years on a farm of 150 acres in Cass Township, where his death occurred in 1891. He was one of the substantial farmers and prominent citizens of the county, and is still survived by his widow, who is a resident of Bloomdale, Wood County, O.

George F. Van Eman was reared on the home farm in Cass Township and for years was engaged in farming in that township, removing to Van Buren, O., in 1903, in which year he erected a modern residence, which is one of the finest homes in Van Buren, having all of the latest conveniences and luxuries, including steam heating, and a hot and cold water system. He also owns an interest in the old home farm of 150 acres in Cass Township, which is very valuable oil property.

In 1886, Mr. Van Eman was united in marriage with Miss Elizabeth Smith, who was born and reared in Cass Township, and is a daughter of Aaron and Margaret (Gross) Smith, who were prominent farmers of this township. The father died in the spring of 1906, and the mother died in 1896. Mr. and Mrs. Van Eman have one son, Charles Ross, who, after graduating from the Van Buren High School attended Wooster College for two years, after which he taught two terms in Cass Township. Mr. Van Eman is a man of public spirit and enterprise, and has served in various township offices, having been constable of Cass Township for six years, road supervisor for two years, and truant officer of Van Buren one year.

JOHN T. MONTGOMERY, who stands at the head of many of the financial institutions and important industries of Hancock County, is one of the prominent and influential citizens of Findlay. He is vice-president of the Commercial Bank and Savings Company and also president of the Independent Torpedo Company, both of Findlay; is president of the Eastlake Milling and Mining Company of Edwards County, Colo., and also president of the Arkansas Land and Developing Company and of other smaller business combinations. Additionally he owns farm and oil lands in Hancock and Mercer Counties and properties of value in other parts of the country, and is one of the very successful developers, producers, dealers and contractors in oil.

John T. Montgomery was born at Renfrew, near Ottawa, Dominion of Canada, in 1853, and is a son of William Montgomery, who was born in Ireland in 1820 and emigrated to Canada, where he died in 1894. Mr. Montgomery is a true type of self-made man. He had few advantages of any kind in his youth and was yet a boy when he learned the blacksmith trade and spent his early manhood working at the forge. When twenty-four years old, in 1877, he went to the Pennsylvania oil fields and worked for a time as a blacksmith in Clarion County, in the meanwhile carefully investigating and subsequently acquiring a small lease in Allegany County, N. Y., which was a part of the Bradford oil fields, lying just across the state line from McKean County, Pa. Just ten years later, in 1887, Mr. Montgomery transferred the scene of his operations to Findlay, O., entering then upon what has proved a remarkably successful career as a producer and contractor in oil. He became senior member of the firm of Montgomery & Stitt, at the beginning of his operations, one of the most widely known firms in all this section, one that owned wells in Hancock, Wood, Mercer, Sandusky and Lucas Counties, O. He also became interested in lumber and at one time, in asociation with two other capitalists, was the owner of the Findlay Lumber Company, which acquired large tracts of timber land in Missouri. Gradually his business interests broadened and, as mentioned above, he is identified with numerous enterprises of recognized worth and importance in different sections. Mr. Montgomery in many ways has been a decided factor in the development and progress made at Findlay, for in the advancement of the city he chose as his home, he has taken pride and in numerous ways he has contributed to its welfare, not ostentatiously, for such is not Mr. Montgomery's nature, but along the quiet lines that make for permanency. He is notably charitable and the support he gives to benevolent bodies has been willingly and cheerfully bestowed.

In September, 1893, Mr. Montgomery was married (first) to Miss Anna M. George, who, at death, was survived by one daughter, Hortensia. In 1897, Mr. Montgomery was married (second) to Miss Lida M. Shultz, a daughter of Rev. J. M. Shultz, then pastor of the Methodist Episcopal church at Findlay. Two children were born to this marriage: John William, and Irene. The family home is a beautiful residence situated at No. 510 W. Sandusky Street, Findlay. Both Mr. and Mrs. Montgomery are active members of the Methodist Episcopal church, and they occupy a leading positon in the city's pleasant social circles. Mr. Montgomery is a member of the Masonic fraternity.

GEORGE S. STOUGH, president of the school board in Allen Township, Hancock County, O., is a general farmer and stock dealer, and resides on a tract of eighty acres located in Section 32, Allen Township, and is one of the leading citizens of the community in which he lives. He was born September 1, 1868, on a farm in Cass Township, Hancock County, O., and is a son of Christopher Stough.

George S. Stough was three years of age when his parents settled in Allen Township, where he has lived continuously since that time. His education was obtained in the schools of the district, and he has always made farming and stock dealing his occupation. He has made many important improvements on the farm, including the erection of his fine frame residence, to take the place of the old dwelling which was destroyed by fire on January 2, 1905.

Mr. Stough was joined in marriage with Annie Hudson, who was born and reared in Allen Township, a daughter of John W. Hudson, and of their union have been born the following children: Chloe, Collins F., Gail, Glen, Ralph, Merle, Bessie, Gladys, and Clarke. The three last named are deceased, Clarke dying in the fall of 1909, aged three years. Mr. Stough holds membership with the I. O. O. F., and order of Ben Hur. He has been a member of the school board of Allen Township for the past four years, and was elected president of that body in 1909.

DANIEL F. LIGHTFOOT, a leading citizen of Portage Township, Hancock County, O., and township road superintendent, resides upon his valuable farm of eighty acres, which is situated in Section 9, three and one-half miles northeast of the farm on which he was born, December 3, 1851. His parents were Henry and Margaret (Russell) Lightfoot.

Henry Lightfoot was born in Indiana and was a son of Henry H. Lightfoot. The former came to Portage Township when a young man and the latter followed at a later date and died here during the Civil War. Henry Lightfoot served three years as a soldier in that great struggle, being a member of Co. K, 21st O. Vol. Inf. He was married to Margaret Russell, who was born in Pennsylvania and was brought to Portage Township in girlhood, by her parents, Thomas and Susan Russell. In 1858, Henry Lightfoot and family moved to

Findlay and he died there in 1900 and his wife in 1895.

Daniel F. Lightfoot was seven years old when he was brought to Findlay where he was reared and educated. He had a natural leaning in youth toward mechanics and learned the business of stationary engineer and for twenty-one years made that his main line of work, for seven years of this period being employed at the electric light station at Findlay. He has owned his present farm since 1887 but did not locate on it until the spring of 1905. He carries on a general farming line and has demonstrated that a man may be competent in more than one line of activity if he exercises good judgment.

Mr. Lightfoot was married to Miss Louisa Pendleton, a daughter of Joel and Amy (Sherman) Pendleton, the former of whom died in 1893 and the latter in 1905. Joel Pendleton was a leading citizen of Hancock County for years and was county surveyor. Mr. and Mrs. Lightfoot have had six children: Frank, who is an electrician, lives at Los Angeles, Calif.; Carrie M., who resides at home; Bessie B., who died aged nine years; Amy E., who is the wife of Wallace A. Archer; and Willie J. and Myrtle O.

In politics Mr. Lightfoot is a Republican and he has served in a number of responsible public positions. From 1889 until 1895 he was superintendent of the Hancock County Infirmary, and from 1886 until 1889, he was superintendent of Maple Grove Cemetery. He has been interested in military affairs for a number of years and helped to organize the old organization known as Co. B, 11th O. N. G., which now forms Co. A, 2nd O. N. G., of which he was captain for several years. For eleven years he was identified with the National Guard, entering as a private and advancing through merit to a captaincy. During the Spanish-American War he served as captain of an organization of the Sons of Veterans and he is generally known as Captain Lightfoot.

CLARENCE JOSEPH OLLER, cashier of The Commercial Bank & Savings Company, at Findlay, O., of which he was one of the organizers, has been identified with the banking business for more than twenty years. He was born on a farm in Delaware County, O., August 23, 1863, and is a son of John and Mary Oller, the latter of whom is deceased, but the former continues to live in Delaware County.

Clarence J. Oller remained on the farm until he was seventeen years old, and then attended school at Delaware, O., securing a complete Normal and business trainng in the Ohio Business College and the National Pen Art Hall and Business College of Delaware, O., and the Iron City Commercial College of Pittsburgh, Pa.

Mr. Oller, after having graduated from the above named schools, purchased an interest in the National Pen Art Hall and Business College and was associated with Professor George W. Michael for one and one-half years, severing his connection with this institution in 1883. He came to Findlay and organized the Findlay Business College, which he successfully conducted for about seven years, after which his connection began with the banking business. He began with The Farmers National Bank, now The Buckeye National Bank, where he remained eight years, and then went to Greenspring, O., where he organized The Commercial Bank Company and remained three and one-half years, and then returned to Findlay.

The Commercial Bank & Savings Company, of Findlay, was organized in the latter part of 1900 and began business on February 20, 1901. Mr. E. C. Taylor was the first president, and continued until the spring of 1910, and Mr. Oller has been cashier from the beginning. The other officers are: John B. Heimhofer, of Findlay, president; John T. Montgomery, vice-president; and Charles H. Bigelow, secretary-treasurer. The officers are directors, together with Dr. N. L. MacLachlan and W. J. Frey, treasurer of Hancock County, O., and N. W. Cunningham, of Bluffton, O. These are all men of capital and high personal standing.

Mr. Oller was married to Miss Nellie J. Ballard, of Hancock County, a daughter of Dr. H. D. Ballard. They have one daughter, Mary Imogene.

Mr. Oller is additionally interested in successful business enterprises, being director and treasurer of The Findlay Sucker Rod Company, a director in The United States Electric Porcelain Company, treasurer of The Buckeye Steam Laundry Company, vice-president of The Commercial Bank Company, of Greenspring, O., and cashier of The Vanlue Banking Company, Vanlue, O.

He is identified with the Odd Fellows and Knights of Pythias, and is a member of the First M. E. church of Findlay, O.

MNASON A. ADAMS, a well known farmer and much esteemed citizen of Allen Township, Hancock County, O., is the owner of 164 acres of highly cultivated farm land, eighty-four acres of which lie in Section 20, and eighty acres in Section 29, and has practically been a lifelong resident of this community. He was born July 7, 1833, near Danville, Columbia County, Pa., which is now known as Montour County, and is a son of Paul and Margaret (Diehl) Adams.

Paul Adams came from Montour County, Pa., to Ohio in 1835, bringing his family in covered wagons, and settled in Richland County. Being a man of education and culture, and unaccustomed to manual labor, he taught school there until 1841. He then came to Hancock County, where in 1833, he had entered a tract of eighty acres in section 29, Allen Township, for himself, and eighty acres in Section 20 for his brother-in-law, Jacob Foust, who came to the county in 1838 and spent the remainder of his life here. On the evening of March 28, 1841, Paul Adams and family arrived at Van Buren, O., and soon after began preparations toward making a clearing on his land large enough to erect a cabin. The news became circulated in this section of the township of Mr. Adams' intention to build a cabin of hewn logs cut from standing timber, and when the appointed day arrived, there were enough neighborhood men on hand to cut and hew the timber, and they erected before sun-down a cabin which was 18 by 22 feet. Mr. Adams taught school here during the winter months for eight years, and in the summer devoted his time to clearing the land, which was wet and in need of draining, and placing it in a state of cultivation. Here his death occurred January 28, 1850, of typhoid fever. His widow subsequently married David Dorsey, now deceased, and her death occurred in December, 1891, at the advanced age of eighty-three years.

Mnason A. Adams was reared on his present farm and attended the district school of the township about four months each year, attending five terms while his father was the instructor. He was sixteen years of age at the time of his father's death, and being the eldest of the seven children living, a great many responsibilities fell to his lot. At that time there was considerable illness in the neighborhood, and often the whole family was down and scarcely able to wait upon one another.

Mr. Adams, like his father, was a teacher for a number of years and continued to teach during the winter seasons until he was twenty-nine years of age. In 1852 he taught school in a small round log house, in which the seats were made by splitting small trees and smoothing off one side, putting in wooden pegs for supports. The desks were arranged along the sides of the building and were made of two-inch boards with holes bored in and wooden pins driven through for foundations. He taught a month of twenty-six days and received fifty cents a day for his services and boarded himself. With a part of the first money so earned he purchased his first cook stove. When he moved on the place on which he lives it was one and one-half miles distant from any other house east or south. One family lived one and one-half miles west and there was one mile between him and the nearest house on the north. The land all around was forest and was owned by speculators.

Mr. Adams finished clearing the land, which he has thoroughly tiled and placed in a high state of cultivation, and has made all of the improvements on the farm, erecting a fine brick residence in 1884. He also purchased the tract of forty acres which his father had sold previous to his death, and also bought in small portions, the eighty-four-acre tract which his father had entered for Mr. Foust. Mr. Adams has always followed farming in a general way in connection with stock raising and is recognized as one of the most substantial and progressive farmers of the township. He is politically a Republican and served twenty-six years on the school board of the township, and as justice of the peace some time, although the township is strongly Democratic. He is a member, trustee, and steward of the Salem M. E. church in Cass Township.

In October, 1863, Mr. Adams married Cordelia Dorsey, his step-sister and a daughter of David Dorsey, and to them have been born nine children: Margaret, who is the wife of Jos. Wineland, who operates the home farm; Clara Arabella, who died in July, 1893, was the wife of George Gaylord; Sarah Anna; Viola Cordelia, who died aged six months; Samuel Mnason, who is a machinist, is employed by the Buckeye Traction Co. of Findlay; Paul David, who died in infancy; one son who was born dead; Nellie, who married Nelson Hiestand of Michigan, and May Adeline.

NICHOLAS ARRAS, who resides on his valuable farm of 203 acres, which lies in Section 31, Eagle Township, Hancock County, O., twelve miles southwest of Findlay, along the Redick road, was born on this farm, May 27, 1861, and is a son of John and Margaret (Essinger) Arras.

John Arras was born in Germany and was

brought to America by his parents when he was ten years old. His father, Peter Arras, was one of the early settlers of Marion County, O., locating about 1831 and later removing from there into Hancock County and acquiring land in Eagle Township on which he lived until his death. John Arras engaged in farming in Eagle Township and became a man of excellent standing in his neighborhood. He died in 1899. He married Margaret Essinger, who was also born in Germany, a daughter of Nicholas Essinger whom she accompanied to America in girlhood. Her father settled in Van Buren Township, Hancock County, O., and was engaged in farming and stock raising. Mrs. Arras died in 1894.

Nicholas Arras grew to manhood on the home farm and attended the district schools of Eagle Township. Since the farm came into his possession he has made many improvements, erecting a commodious and comfortable farm residence and substantial barns and granaries, much of the improving having been done within the last five years. This farm is said to be the best tiled one in the township. Mr. Arras is a progressive farmer and a very successful one, a partial explanation of this being that he uses only high grade seed. He raises considerable stock and makes a specialty of hogs, each year having many head ready for market.

Mr. Arras was married on September 10, 1885, to Miss Margaret Rauch, a daughter of Christian and Maria Rauch, the former of whom was born in Van Buren Township, Hancock County, and the latter in Germany. Mrs. Rauch was brought to America and Ohio when yet a girl and married in Van Buren Townshrip, Hancock County, where she and Mr. Rauch still reside on their farm. Mr. and Mrs. Arras have had four children: John C.; Adam W., who graduated from the Findlay Business College, with class honors, in 1908; Amanda L., who died in 1892, when one year old; and Eva Katie. Mr. Arras and his family are members of the German Lutheran church at Jenera, O. Mr. Arras is one of Eagle Township's representative men and has served three years as a member of the township school board.

ALVIN C. EWING, county recorder of Hancock County, O., now residing at Findlay, is a prominent citizen of this county and an influential member of the Democratic party. He was born in Liberty Township, Hancock County, O., November 26, 1854, and is a son of Cornelius S. and Elizabeth (Ensley) Ewing.

Alvin C. Ewing was reared on his father's farm and obtained his education in the country schools. At the age of twenty-one he came first to Findlay, where, for seven years he was a clerk in a general store, after which he returned to the farm and shortly afterward was appointed superintendent of the county infirmary, which office he retained for two years and then resumed farming. Later he embarked in the mercantile business at Mt. Cory and for six years served as mayor of that town. For ten years previous to assuming the duties of county recorder, on September 1, 1909, he resided on his farm in Union Township, where he also, at different times, filled the offices of township clerk and trustee.

Mr. Ewing married Miss Malissa A. King, who was born and reared in Hancock

E Wanamaker

County and is a daughter of John King, Sr. They have one child, Maud May, who is the wife of George F. Guin. Mr. and Mrs. Guin have a daughter, Josephine. Mr. Ewing belongs to the fraternal orders of Knights of Pythias and the Maccabees, also is an associated member of the Grand Army of the Republic.

ELIPHES WANAMAKER, deceased, formerly president of the Independent Torpedo Company, an important business enterprise of Findlay, O., was numbered with the city's able business men and substantial citizens. He was born in 1849, in Westmoreland County, Pa., and died at Findlay, May 5, 1910. He was a son of Lewis and a grandson of Peter Wanamaker. The name of Wanamaker is one that has long been held in very high esteem in the United States, invariably representing, as it does, high standards of citizenship and business capacity above the ordinary. The original branch probably came from Holland but for generations it has grown and prospered in Pennsylvania and from there has scattered over the Union.

Eliphes Wanamaker grew to sixteen years on his father's farm and then learned the carpenter trade. He was more ambitious than some other members of the family, and was not afraid to venture out from home surroundings into the oil fields and try his fortune contesting with others gathered from every part of the country. He went to work as a tool dresser and from that became an oil well driller and in this capacity became a judge of property and subsequently a shrewd investor, going into the oil contracting business. Prior to 1885 he worked mainly in the Venango oil fields but in that year came to Hancock County, establishing his home at Findlay, where he resided for twenty-four years. During this time he became interested in numerous successful business enterprises, one of these being the Independent Torpedo Company. In politics he was a Democrat but never consented to hold political office, although he possessed many of the qualities so needful in a public official—judgment, foresight, courage and personal integrity. He belonged to both branches of the order of Odd Fellows, and also to the Knights of Pythias.

Mr. Wanamaker was married to Miss Vina C. Mainhart, of Johnstown, Pa., and they had one daughter, Verna, who married E. C. Edwards, of Leipsic. With his family he belonged to the Lutheran church. The comfortable family home is located at No. 903 South Main Street, Findlay.

ISAAC HART, who served as a member of the board of county commissioners of Hancock County, O., from 1901 until 1907, resides on his farm of 160 acres, situated in Section 27, Portage Township, and owns a second farm, of eighty acres, which lies in Section 16 in the same township. He was born on his father's farm located in the southwest corner of Section 27, Portage Township, June 13, 1845, and is a son of Abraham and Christianna (Linn) Hart.

Abraham Hart was born in Pennsylvania, followed farming all his life and died on the old Hart homestead in advanced age. He was married in Ashland County, O., to Christianna Linn, who was born in Maryland and died also on the old homestead in Portage Township.

Isaac Hart was reared on the home farm and attended the country schools and later spent several years alternating teaching in the winter seasons and cultivating the farm in the summers. After marriage he located on this farm but subsequently removed to Findlay, where he resided for seven years, attending to other business interests, but moved back to the farm in March, 1909. For a number of years Mr. Hart has been selling a patent farm gate which has attracted much favorable notice through the agricultural districts wherever shown. Mr. Hart has exhibited the Chain Hinge Gate all over the state, making use of tests to prove its strength under strain and its general utility. He makes use of thirty-two of these gates on his own 240 acres and has disposed of 160 in Hancock County and a large number in Van Wert, Lucas, Wood and Logan Counties, farmers recognizing that it has superior points to anything of the kind ever before called to their attention. Mr. Hart does not personally cultivate his land, having a capable farmer in charge.

Mr. Hart was married to Miss Miriam Moorhead, who was born and reared on the present farm and died here in September, 1897. She was a daughter of John Moorhead, Sr. They had seven children, namely: William L., who is a farmer residing in Kansas; Laura, who is at home; Edgar J., who resides in Allen Township west of Van Buren; Mary Belle, who is the widow of Jacob Burman; Albert Marion, who died aged thirteen years; Dora C., who is the wife of William Poole, of Arkansas; and Harriet Blanche, who died aged four years. Mr. Hart is a member of the Methodist Episcopal church at Findlay and is one of its board of trustees. He is a Republican in his political views and has been more or less interested in public affairs ever since reaching manhood. During his long period of service as a county commissioner, he proved faithful to the interests involved and contributed to the efficiency of the board by his advice and good business judgment.

RICHARD M. FOREMAN, who resides on a well improved and highly cultivated farm of eighty acres, which is located in Section 9, Eagle Township, Hancock County, O., was born on his present farm August 15, 1866, and is a son of John F. and Mary (Yates) Foreman.

John F. Foreman was a native of Pennsylvania and engaged in agricultural pursuits on the farm now owned by our subject, his death occurring there January 14, 1908. His wife was born and reared in Eagle Township, Hancock County, O., her parents having been prominent farmers of the county. She also died on this farm, January 11, 1898.

Richard M. Foreman was reared and has always lived on the farm where he now resides, and his educational training was obtained in the local schools. Mr. Foreman has always followed farming, and his land is well tiled and ditched, has good substantial buildings, and is up-to-date in every respect.

On January 26, 1909, Mr. Foreman was married to Alta Fenestmaker, a daughter of William and Sarah Ann Fenestmaker, who were prominent farmers of Eagle Township, Hancock County. Mr. Fenestmaker died on his farm in this township, in 1885, and was survived by his widow until 1898. The following children have been born to Mr. and Mrs. Foreman: Ethel, Ralph, Lena, Gertrude and Ray.

WILLIAM D. McCAUGHEY, secretary and treasurer of the Buckeye Traction Ditcher Company, which is the largest independent concern at Findlay, O., is a native of Hancock County and was born in a log cabin on a farm, in Allen Township, June 26, 1846, and is a son of John W. and Eliza (Alban) McCaughey.

John W. McCaughey was born in Stark County, O., amid pioneer surroundings, and was a son of John McCaughey who was born in Londonderry, Ireland. He married Eliza Alban, who was also born in Stark County and was a daughter of Capt. William Alban, who served in the War of 1812, under General Hull. John W. McCaughey and wife moved to Hancock County in 1842.

William McCaughey was reared on what was then a back-woods farm and his educational advantages were limited. He remained a farmer until he was thirty-two years of age and then came to Findlay, where, for a number of years he was entrusted with interests connected with the administration of estates and receivership duties. During 1887 he served as a member of the school board; from 1890 until 1900 he was a member of the board of equalization, in the latter year being president of this body, and from May, 1904, until January 1, 1907, he was a member of the board of public service, elected to the same on the Republican ticket. In 1891 he was appointed gas trustee of Findlay. Thus Mr. McCaughey was well known to the business men, financiers and public officials of Findlay before he identified himself with his present enterprise and it must be acknowledged that his name added great stability to it.

The Buckeye Traction Ditcher Company came to Findlay under the name of Van Buren, Heck & Marvin, in February, 1903, and Mr. McCaughey took charge on January 1, 1905. At that time the business was in what is termed bad shape and already a petition of the creditors of the company had been filed asking that a receiver be appointed, but when it was learned that Mr. McCaughey had been placed in charge, this petition was recalled. The panic of 1907 affected this concern as it did so many others, but there came no suspension either of work or the payment of wages, Mr. McCaughey and the president of the company, Dr. N. M. McLachlin, attending to these matters personally. The present board of officers is as follows: Dr. N. M. McLachlin, president; Collin D. Hayward, vice-president; William D. McCaughey, secretary and treasurer; and C. S. Brown, superintendent of manufacture. Employment is afforded 165 men which will shortly be increased to more than 300 when contemplated improvements are completed.

In 1870, Mr. McCaughey was married to Miss Harriet Miller, a daughter of William Miller, of Hancock County. Mrs. McCaughey was born at Lockport, N. Y., but came to Seneca County when three years of age, and to Hancock County when fifteen years old.

GEORGE F. HAMMOND, a progressive and successful farmer and stock raiser of Union Township, owning 118 acres of valuable land situated in Section 6, has been a resident of Hancock County for fifty-eight years. He was born in Carroll County, O., September 19, 1838, and is a son of George and Anna Hammond.

George Hammond was born in Virginia and was taken to Carroll County, O., by his parents and later was married there to Anna Kinney, who died in 1863. She was a native of Maryland. The death of George Hammond occurred in Adams County, Ind., where he had spent the closing years of his life. He was a cooper by trade.

George F. Hammond was reared in Carroll County and obtained his education in the country schools. When Civil War was declared, he was one of the first to enlist for service in the Union army, at Findlay, O., on August 25, 1861, becoming a member of the 21st O. Vol. Inf. He took part in a number of the most important battles of the war, including Stone River, Chickamauga, Missionary Ridge and Atlanta, was with Sherman in his great march to the sea and saw hardship of every kind but survived it all and was mustered out at Louisville, Ky., and received his honorable discharge at Columbus, O., July 25, 1865. He then returned to peaceful pursuits and settled in Union Township, Hancock County. He has a valuable property which is well improved and well tiled. While he raises no registered stock he has an abundance of the ordinary variety and finds stock raising one of his most profitable industries.

On October 28, 1858, Mr. Hammond was married to Miss Elizabeth Seitz, who died July 31, 1892, at the age of sixty years. She was born and reared in Blanchard Township, Hancock County, where her parents, Samuel and Martha Seitz were farming people. Six children were born to this union: Jane, Sherman, Alfred, Emma, Amanda and George. Jane married Samuel Peterson, of Union Township and they have the following children: William, Dora, Pearl, Everett, Molly, Mary, Hazel, Bessie, Glenn and Roy. Sherman married Adelia Burkholter of Putnam County, and they have two children: Martin and Wilbur. Alfred married a Miss Perkins, of Union Township and they have seven children: Francis, Velma, John, Leona, Harry, Howard and Bertha. Emma married a Mr. Zucker, of Columbus Grove, and they have two children: Merl and Delmar. George married Lucy Cyrus, of Putnam County, and they have two children: Ray and Oliver. Amanda died in August, 1903, at the age of twenty-nine years. Mr. Hammond has twenty-three grandchildren and he has reason to be proud of his descendants and they often gather at the old farm to gladden him with their tokens of respect and affection.

JOHN S. BEAGLE, township trustee of Orange Township, Hancock County, O., and a leading farmer of this section, owns 192 acres of valuable land which lies in Section 1. He was born in Jackson Township, Hancock County, January 31, 1853, and is a son of Alva and Martha (Fox) Beagle.

Alva Beagle was born in Muskingum County, O., and came to Hancock County in 1852, and in the same year was married to Martha Fox, a daughter of Samuel Fox, who was a native of Pennsylvania. Five children were born to this marriage, namely: John S., Anna, William Edwin, Martin and Sadie I. Alva Beagle and wife had settled in Jackson Township where he secured eighty acres of land and cleared the larger part of it himself. All the children were born there. He and wife were members of the German Baptist church in which he took much interest and contributed to building the present edifice.

John S. Beagle attended school in Jackson Township and helped his father on the farm where he lived until his own marriage, when he came to his present place in Orange Township. This land had all been cleared, but few improvements had been made and Mr. Beagle erected the fine buildings now standing. He has shown much enterprise in carrying on his agricultural work and is numbered with the substantial and successful men of this section.

In 1880, Mr. Beagle was married to Miss Lyda D. Marshall, a daughter of William Marshall, of Orange Township, and they have nine children, all of whom are at home except the eldest son, William, who married Luella Crowell, of Union Township, and they have a daughter, Catherine D. The other members of the family are: H. C., Mattie, Nellie, Myrtle, Marshall, Rhoda, Samuel and Helen. Mr. Beagle and family attend the Evangelical church. He is a Republican in politics, and is serving in his second term as township trustee.

JOHN E. BETTS, a representative citizen of Findlay, O., a member of the city council, representing the First Ward, is the junior member of the law firm of Axline & Betts, one which is entrusted with a large amount of the important litigation of city and county. Mr. Betts was born on a farm in Wood County, O., November 3, 1863, and is a son of Edward C. and Elizabeth (Walters) Betts.

Mr. Betts is of pioneer ancestry and Revolutionary stock. His great-grandfather was Capt. Hezekiah Betts, who entered the Continental army when a mere boy and gained promotion under Major Willis and General Webb and was captain of his company, although not yet quite twenty-one years of age, at the surrender of General Cornwallis, and the subject of this sketch has in his possession the commission issued by Oliver Wolcott, then governor of Connecticut.

He was born in Connecticut, July 31, 1760, and died May 31, 1837, at Norwalk, Conn.

Dr. Alfred Hanford Betts, son of Captain Hezekiah and grandfather of John E. Betts, was born at Norwalk, Conn., September 2, 1786, and came to the Western Reserve about 1815-16. He was a scholarly man and was one of the founders of the Western Reserve University which was established first at Hudson, O., but is now one of the great educational centers at Cleveland, and assisted in establishing Oberlin College. He was one of the early medical practitioners and appears to have been a man of more than ordinary capacity in many ways.

Edward C. Betts, father of John E. Betts, was about three years old when his father came to the Western Reserve. In 1836 he engaged in teaching school in Defiance County, O., but later acquired land in Wood County, and there engaged in agricultural pursuits for a number of years. After his son, John E. Betts, had become well established at Findlay, with his wife he came to this city and here his death occurred on October 6, 1908, being then in his ninety-sixth year. His venerable widow yet survives and is still a resident of Findlay.

John E. Betts was reared on his father's farm in Wood County and attended the country schools until he was sixteen years of age, when he accepted a position in a village general store, with the understanding that he should receive a yearly salary of $50, with board and washing. After nine months, however, Mr. Betts had changed his mind about being a merchant and withdrew from the contract and on being paid what was owing to him, made other plans for the future. These included a better educational training and after a short period in a school in Michigan, he entered the Wesleyan University, at Delaware, O. In 1889, Mr. Betts came to Findlay and entered the law office of his uncle, the late Judge Jacob F. Burkett, who was formerly Supreme Justice of Ohio. Mr. Betts was admitted to the Ohio bar in 1890 and in 1900 became associated in the practice of law, with J. Frank Axline, under the firm style of Axline & Betts. The business of the firm covers all branches of general practice and their suite of four well appointed offices are at No. 65-66, in the Adams Block, Findlay.

Mr. Betts was married in 1902, to Miss Elizabeth F. Fisher, a daughter of A. J. and Martha E. (Hart) Fisher, of Findlay, O. The father of Mrs. Betts was born in Cass Township, Hancock County, O., February 19, 1849, a son of John and Katherine A. (Dunlop) Fisher, both natives of Lancaster County, Pa. They came to Hancock County in 1835 and settled on a partly cleared farm in Cass Township. A. J. Fisher was educated in the schools at Findlay and for fifteen winters taught school while engaging in farming during the summers. His first school was in Washington Township. He became a man of consequence in Hancock County, on many occasions served with efficiency in township offices. In 1872 he married Martha E. Hart, a daughter of Cyrus and Elizabeth Hart, who were pioneers in Hancock County. Mrs. Fisher died November 1, 1902. Mr. Fisher was early interested in the oil industry in this section and was president of the oil company that opened the first field north of Findlay.

Mr. and Mrs. Betts have one son, Jackson E. Betts. With his family Mr. Betts belongs to the Episcopal church. He has been an active and interested citizen ever since making Findlay his home. He has been interested in many business and manufacturing concerns, and his name appears in the directorate of many of Findlay's important enterprises. He is identified with the Knights of Pythias and with the Sons of the American Revolution.

CHESTER L. GREEN, general farmer and stock raiser, residing on his well kept farm of eighty-five acres, situated in Section 7, Union Township, Hancock County, O., lying on the Ridge road, five and one-half miles northwest of Mt. Cory, O., was born in this township, July 10, 1858. He is a son of William and Rachel (Weünger) Green.

William Green was born in Pennsylvania and was a son of William Green who was one of the pioneers in Hancock County and died in Union Township. His son, William Green, was then a young man and he still lives on the old home farm. His wife died in 1866.

Chester L. Green was eight years old when he lost his mother. He grew up at home and attended school and later taught school for fourteen terms in Putnam County. Mr. Green has made farming and stock raising, however, his main business and has prospered far beyond the average. His well kept buildings and carefully cultivated fields indicate that he takes pride and pleasure in his work and that success should reward him is not merely a matter of chance. Within the past seven years he has greatly improved his place, rebuilding his house and barn and tiling the land. These improvements have been costly but they have made his property much more valuable.

On October 25, 1883, Mr. Green was married to Miss Emma Crow, of Putnam County, O., a daughter of William R. and Bersheba (Brower) Crow, the former of whom was a substantial farmer. He died in Putnam County in 1892, aged seventy-one years and was survived but two years by his widow, who was aged seventy-four years.

Mrs. Green was educated in Putnam County and taught one term of school there. To Mr. and Mrs. Green seven children were born: Atlee C., Clare R., William Everett, Joycie G., Leslie C., Milford V. and Jessie, all of whom survive except Jessie, who died when nine days old. Atlee C., the eldest, attended the High School at Mt. Cory, O., where he was graduated in 1903 and taught two terms in the district schools of Hancock County. Clare R. was graduated from the Pandora High School in 1907, following which he taught school in District No. 5, Liberty Township, Putnam County, and in 1909 the grammar school at Benton Ridge, O., and in the summer of 1910 was superintendent of the High School at Depont, O., also attending Otterbein College at Westerville. He is a very close student and seemingly has a bright future ahead of him in the educational field. The third son, William Everett, graduated from the Pandora High School in 1910 and is employed to teach in Putnam County. Mr. and Mrs. Green are giving their children every advantage in their power. They are members of the United Brethren church at Pleasant View where Mr. Green has been superintendent of the Sunday-school for nine years.

PETER RAUSCH, who is engaged in general farming on a tract of 100 acres in Orange Township, Hancock County, O., was born June 13, 1846, in Germany, and is a son of John and Barbara Rausch, both of whom always lived in Germany. The mother died when our subject was but eleven years of age.

Peter Rausch was reared and obtained his education in his native country, and at the age of twenty-two years came to America, landing in New York City after a voyage of thirteen days. He then came to Findlay, O., and soon purchased a tract of sixty acres in Eagle Township. This land had originally been entered from the Government by the former owner, and about thirty acres of it had been cleared when Mr. Rausch made his purchase. He subsequently sold this farm, and purchased his present farm of 100 acres in Section 1, Orange Township, and here carries on farming in a general way. About five acres of the farm are yet in timber, but Mr. Rausch has done considerable draining and otherwise improved the land, including the building of nearly all of the fences on the place.

Mr. Rausch was married about one week after landing in America, his wife, who was Susanna Krichbaum, having come to this country on the same vessel. Of their union were born the following children: Peter, Philip, Katie, William, John, George, Jacob, and Charles. John died at the age of seven years.

Mr. Rausch has been a resident of Hancock County for thirty years, and is one of the representative and public spirited citizens of Orange Township. Politically he is an Independent Democrat, but has never sought office for himself. He is a charter member of the German Lutheran church of which he is secretary.

J. E. BICKNELL, who is engaged in the production of oil in Hancock County, O., has been a resident of Findlay since 1889, and was born September 10, 1863, in Morrisville, Madison County, N. Y., a son of J. Bennett and Hannah W. (Wagner) Bicknell. J. Bennett Bicknell was a merchant during his early life, but after removing with his family to Cleveland, O., in 1879, he engaged in paper manufacturing with the Cleveland Paper Company. He died in Cleveland in 1899, and is survived by his widow.

J. E. Bicknell was about sixteen years old when his parents removed to Cleveland, and after attending the High School there one year, began working in the Valley Paper Mill, of which his father was manager, and two years later entered the employ of the Meriam and Morgan Paraffine Company, with whom he continued six years, and who were the pioneers of the paraffine business. In 1886 he went to Oil City, Pa., where he became manager of the Keystone Refinery and in 1889 came to Findlay as superintendent of the Peerless Refining Company, with which concern he was identified seven years. Since that time he has been engaged in the production of oil in Indiana, Illinois, Kansas and Hancock County, O., and devotes the greater part of his time to this business. He was appointed the receiver for the Findlay Ax & Tool Company.

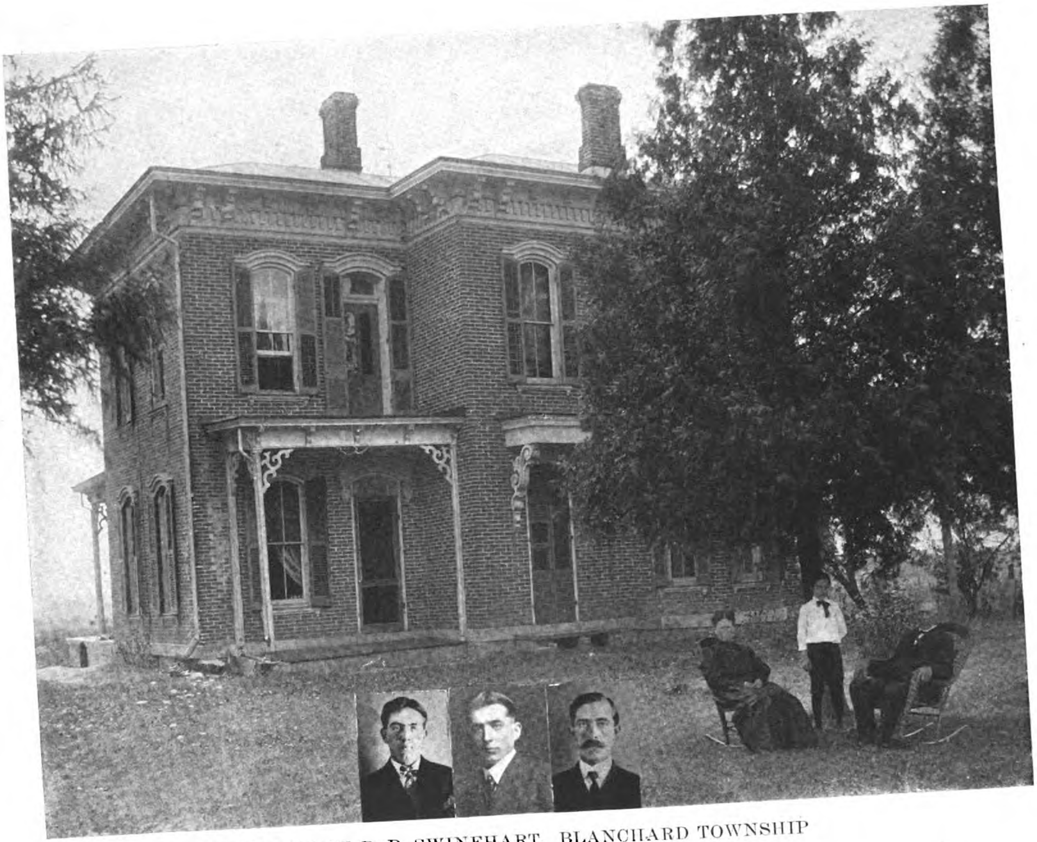
Mr. Bicknell was married in 1890 to Ida Grove, who is a native of Belmont County, O., and they have one daughter, Helen G. Bicknell. He is affiliated with the Elks, the Maccabees and the Masons.

JOSEPH PUGH, who resides on his valuable farm of eighty acres, which is situated in Section 35, Madison Township, Hancock County, O., was born in Van Buren Township, Hancock County, April 30, 1843, and is a son of John W. and Sarah Pugh.

The parents of Mr. Pugh were early settlers in Hancock County. His father entered 160 acres in Van Buren Township, one mile west of Mr. Pugh's present farm, and there carried on agricultural pursuits until the close of his life. He was a man of some consequence in his township and served some eight years as a justice of the peace.

Joseph Pugh was reared in Van Buren Township and obtained his schooling there. From youth he has been engaged in farming, locating on this place after his marriage. He devotes his land to general agriculture, grain growing and stock raising, and is numbered with the prosperous and successful farmers of Madison Township although in late years he has practically resigned the management of his farm to his son, John W. Pugh.

Joseph Pugh was married in 1865 to Miss Martha Johnson, a lady who was born in Van Wert County, and they have had three children: Zenobia, who is the wife of John Steinman of Van Buren Township, and they have eight children—Della, Bertha, Marie, Cloyd, Ivin, Franklin, Howard and Raymond; John W., who was born and reared and attended school in Madison Township and now is manager of his father's farm, married Mattie Chestnut, of Hardin County, O., and they have three children—Cuma, Emma and Wilbert; and Arlando, who died in infancy. Mr. Pugh has always been one of the responsible men of his township since locating here and for fourteen years served as a member of the school board in District No. 6, Madison Township. J. W. Pugh is identified with the order of Maccabees and attends Lodge No. 471 at Williamstown



RESIDENCE OF P. P. SWINEHART, BLANCHARD TOWNSHIP

JOHN D. RENSHLER, funeral director and embalmer, has been established in this business at Findlay, O., since 1895. He was born on a farm east of Findlay, near the Van Horn Cemetery, in Amanda Township, Hancock County, May 6, 1871, and is a son of Levi W. and Mary J. (Harrison) Renshler. The father of Mr. Renshler moved from Pennsylvania to Ohio.

John D. Renshler attended the local schools and when he embarked in the undertaking business, with J. Clark Bright, of McComb, he was entirely without capital. He was associated with Mr. Bright at McComb for about six years and is still interested there although residing at Findlay, and is also a member of the firm of Renshler & Deeds, at Rawson, O. Mr. Renshler is also proprietor and manager of the Twentieth Century Couch Manufacturing Company, which manufactures couches, caskets and davenports, together with a general line of funeral furnishings, making a specialty of a davenport which he has patented, as he has also a casket with an old iron finish. They also manufacture the Landon Patent Cement Grave Vault. This factory has been in operation since 1906. Mr. Renshler is a graduate of the Massachusetts College of Embalming at Boston, Mass., of the class of 1894. He is a member of the Guaranteed Undertakers' Co-operative Syndicate and Exchange List Company, of Philadelphia. He has well appointed quarters and keeps a full line of all paraphernalia pertaining to the necessities or demands of his business.

Mr. Renshler married Miss Harriet R. Lanck, of Findlay, a daughter of Michael Lanck, and they have two children: Nellie and Clarence J. With his family he is a member of the Central Church of Christ. He belongs to the Elks, Odd Fellows, Maccabees, Tribe of Ben Hur, Modern Woodmen, Red Men and the Home Guards.

P. P. SWINEHART, a retired farmer of Blanchard Township, where he owns 227 acres of valuable land and is one of the highly respected citizens, was born in Hopewell Township, Perry County, O., July 23, 1848, and is a son of Andrew and Lydia Ann (Stimmel) Swinehart.

Andrew Swinehart was born also in Perry County and was a son of John Swinehart, who was a native of Pennsylvania, and came from there to Perry County, O. John married in Pennsylvania, Christiana Gruber and they had a family of twelve children, which was not an unusual one in those days. He was a soldier in the War of 1812, and escaped all injury in the service. He and his wife died in Perry County. Andrew Swinehart learned the plasterer's trade and he was also a farmer, purchasing forty acres of land in Wood County, of his brother, Daniel Swinehart, and on that farm he died in October, 1897, and was buried in the Weaver Cemetery, Wood County. His widow remains on the homestead. They attended the Lutheran church. Andrew married Lydia Ann Stimmel, a daughter of Peter Stimmel, of Perry County, but a native of Maryland. Andrew Swinehart and wife became the parents of twelve children, eight of whom survive. Of these, the subject of this sketch and one of his sisters are the only ones to make their home in Hancock County.

P. P. Swinehart attended school until he was about sixteen years of age in Perry County, with the exception of one term in Wood County. From his boyhood he helped his father, he being a renter, and followed his trade in Perry County, and afterwards in Wood County, remaining at home until he was twenty-seven years of age. In 1865 he moved to Wood County and helped to clear the farm. After his marriage he settled on his own farm in Wood County, on which he remained for over fifteen years. He then moved to another farm in Wood County and lived there seven years. Subsequently coming to Hancock County, he settled, in September, 1908, on his present farm. The property required but little improving, as the land and buildings were in good condition. While active he carried on farming along general lines, all his land being tillable except twenty acres, which is yet in timber.

In 1875 Mr. Swinehart was married in Wood County to Eva Staley, who at that time was a widow. They had five children, namely: Oliver Allen, an infant (daughter); Charles H., another infant daughter, and Mathias Burton. Mrs. Eva Swinehart died May 6, 1897, and her burial was at Fostoria. Two of the sons, when aged respectively five and seven years, gave their father a terrible fright and aroused the whole city of Findlay. The little lads started to get the cows (which pastured in forty acres of fenced woodland) and became lost, and before their distracted father found them, they had wandered thirty-five miles. Practically the whole city of Findlay, aroused by pealing bells, joined in the search, which happily proved successful after an all-day hunt.

Mr. Swinehart married for his second wife, Miss Sarah Diebert, a daughter of Solomon Diebert, of Lehigh County, Pa., and they had one child, Claude Arthur. This wife died in November, 1901, and was buried in the Weaver Cemetery, in Wood County. On June 19, 1904, Mr. Swinehart was united in marriage with his present wife, who was formerly Miss Mary M. Merryman, a daughter of Fred Merryman, of Marion, Ohio. Mr. and Mrs. Swinehart are members of the North Baltimore Lutheran church, being charter members of the same. The former casts his vote independently, not being a strict party man.

JOHN BAME, who is one of the representative German-American citizens of Orange Township, Hancock County, O., owns an excellent and carefully improved farm of eighty acres. He was born in Germany, November 5, 1857, and was twenty years of age when he came to America, making the voyage on a vessel that required two weeks to cross the Atlantic Ocean.

Mr. Bame had attended school in his native land and had a good German education. He landed at the port of New York and from there came to Hancock County, O., and secured farm work in Van Buren Township and attended two terms of school there. He worked by the month and by the year as a farmer until after his marriage. In 1897 he bought his present farm from Jacob Heldman. He immediately began to improve his property, completing the draining of the land and rebuilding his farm residence and putting all the different structures in good shape. He devotes himself to general farming, especially grain growing and each year also turns out some fine cattle.

Mr. Bame was married in Van Buren Township to Miss Barbara Beach, a daughter of John Beach and they have three children: Mena, Henry and Harvey. Mr. and Mrs. Bame are members of the Lutheran church. He is an independent voter, making his own estimate of the men who desire office and casting his ballot according to his judgment. Mr. Bame has very sensible, practical ideas on general subjects and enjoys the respect of his fellow citizens.

DANIEL E. CHILD, manager of the Hancock Brick and Tile Company, and also manager of the Buckeye Tile Company, at Findlay, O., is one of the representative business men of this city. He was born on a farm in Lorain County, O., June 7, 1843, and is a son of Abijah and Cordelia (Ennis) Child, the former of whom is deceased but the latter survives, being now over eighty-six years of age.

After leaving the country schools, Daniel E. Child attended Oberlin College and for seven years afterward taught graded schools, during the last two years being engaged in the Union Christian College, at Merom, Ind. In 1869 he located at Dayton, embarking in the sewing machine business and from that became a manufacturer of organs and was engaged in the music business in that city until 1887, when he came to Findlay. In 1888, with Mr. Dorney and Mr. Murray, he entered into the business of brick manufacturing and in 1891 he purchased Mr. Dorney's interest, the firm name having been Dorney, Child & Murray. The old factory was near the present plant of the Hancock Brick and Tile Company. In September, 1892, a fire destroyed the old plant and at the time of this disaster, Mr. Murray was caught by the falling walls and lost his life. In the winter of 1892-3, Mr. Child bought the interest of Mr. Murray's heirs, rebuilt the plant and continued until 1903, at which time he purchased the Dorney and Harris plant. This plant had burned two years previously but Mr. Child rebuilt and in March, 1903, the Hancock Brick and Tile Company was organized, the old site of Dorney and Harris being occupied. This plant lies along the T. & O. C. Railroad in the southern part of Findlay, but the offices are in the Buckeye National Bank Building. Employment is given sixty men at this plant and the foreman is D. Earl Child, who is also vice-president of the company.

D. E. Child and Sons also hold a controlling interest in the Buckeye Tile Company, of which D. Earl Child is president and his father, Daniel E. Child, is manager. The Buckeye Tile Company operates three separate factories—one being located at Pemberville, Wood County, O., another at Trowbridge, in Ottawa County, and the third at Curtice, also in Ottawa County and in each of these plants ten men are employed. They are under the supervision of Daniel E. Child and his sons: D. Earl, Leo, and Roy B. Child. The secretary of this company is George E. Harper, of Ada, O. The output is exclusively farmers' drain tile which is shipped to agents in different parts of the country.

Mr. Child has been prominent in the brick and tile industry for twenty-two years but his interests are not confined to this line. In 1887 he entered into the dairy business and in 1900 organized the Findlay Dairy Company, of which he was president until 1908, when he sold. He owns the old Stopher farm of 180 acres, which lies in Marion Township and adjoins Findlay and for twenty years operated a dairy business from that farm. Although formerly and at present interested at North Baltimore, O., Mr. Child never resided there, having maintained his home at Findlay ever since coming to this city in 1887. He organized the North Baltimore Pressed Brick plant and owned a large amount of land there, one tract of sixty acres which he laid out still being known as the Child's addition to North Baltimore. Mr. Child is a man of great business ability and with few exceptions his undertakings have proved successful.

Mr. Child married Mrs. Minnie J. Richardson, of Pittsburg, Pa., and they have three sons, all unmarried, and two of whom are associated with their father in his business enterprises. Mr. Child is one of the active members and liberal supporters of the Baptist church at Findlay.

Mr. Child has been since 1893 an active member of the Symposium, the oldest literary society in the city. He has been an active supporter of reform in politics, but not a strong partisan.

W. A. WILLIAMSON, who is one of the largest breeders and dealers in full blooded stock in Hancock County, O., owns 160 acres of fine farm land, eighty of which is situated in Section 34, Union Township, which has been his home since he was twenty-one years of age, while the other eighty acres are located in Section 3, Orange Township. He was born in Orange Township, Hancock County, O., February 19, 1854, and is a son of W. M. and Jane (McCrosky) Williamson.

W. M. Williamson was a well known farmer and man of influence in Orange Township, where he lived for forty-four years. He was born in Greene County, O., came to Orange Township in Hancock County, in 1850, and died at Mt. Cory in 1894, at the age of eighty-four years. His widow survived him but a short time.

W. A. Williamson obtained his education in the schools of Orange Township and lived at home until his marriage, in 1880, when he came to the present farm. Here he has done a large amount of improving and during the past twelve years has erected his new frame house and barn and has completed the tiling of his land. While he carries on general farming he also gives much attention to stock and his reputation for high grade stock of all kinds has extended all through this section of Ohio. He has other business interests, being one of the directors of the Mt. Cory Elevator and Exchange Company, at Mt. Cory, and is president of the Farmers' Mutual Telephone Company, of Hancock County. He has taken an active part in township affairs, has served as assessor six different times, for seven years was a member of the school board and now is land appraiser.

Mr. Williamson was married October 14, 1880, to Miss Jane Hamilton, of Fairfield County, O., and they have two children: James M. and Ruth Ethel. Mr. Williamson and family are members of the United Presbyterian church of Cannonsburg, in which he is an elder.

WILLIAM F. HOSLER, cashier of the City Banking Company, at Findlay, O., of which he was one of the organizers, was born on a farm in Washington Township, Hancock County, O., February 1, 1862, and is a son of Peter and Susan (Sherman) Hosler.

Peter Hosler was born in Pennsylvania and was only a child when his parents moved to Stark County, O., where he was reared a farmer, but later became a carpenter and contractor. He was married at Canton, O., and immediately afterward moved to Tiffin and shortly afterward to Hancock County, and to Findlay in 1875, when he was elected county treasurer. He was a man of ample fortune, good business perception and public spirit. In 1890 he built the business block in which the City Banking Company has quarters, and he was one of the organizers of this financial institution and its first president. He died in 1897.

William F. Hosler was educated in the country schools and at Findlay, where he attended the High School and after his father became county treasurer he served one year as a clerk in his office and from there entered into the banking business in the Farmers' Bank, as teller. The City Banking Company began business as a private bank on May 1, 1887, and was reorganized as a state bank in 1897. The original organizers were: Peter Hosler, William F. Hosler, Morgan D. Shafer, P. B. Morrison and David and Morris Hosler, brothers of William F. The first president as stated, was Peter Hosler, and the first president after reorganization, was Morgan D. Shafer. All have passed away with the exception of the sons of Peter Hosler. The bank was moved to its present location in 1890. Its present officers are: D. H. Hiestand, of Findlay, president; Charles E. Jordan, vice-president; and William F. Hosler, cashier. The board of directors is made up of the following capitalists: D. H. Hiestand, Charles E. Jordan, William F. Hosler, Morris Hosler and Elmer Y. Sphar, all Findlay men. Mr. Hosler has been cashier ever since 1887, when the bank was organized.

Mr. Hosler married Miss Helen M. Shafer, a daughter of Morgan D. Shafer, now deceased, who was a leading attorney of this city, and they have one child, Mary Louise. Mr. Hosler has additional interests. He is a director of the Buckeye Traction Ditcher Company; is secretary and treasurer of the Findlay Courier Company, and is a director also in the Findlay Table Manufacturing Company. He has been affiliated with the Odd Fellows since he was twenty-one years of age and is a charter member of Lodge No. 75, Elks.

GEORGE H. WERTENBERGER, who, for the past twelve years has been engaged in the furniture business at Arlington, Hancock County, O., was born April 28, 1876, in Madison Township, Hancock County, O., and is a son of John Wertenberger.

John Wertenberger was born in Germany and in 1859, at the age of eleven years, came to this country with his father, George Wertenberger, who settled on land just south of Arlington in Madison Township. The father of our subject is still living, a resident of Arlington, but the mother died in 1898 on the home farm just south of Arlington.

George H. Wertenberger was reared on the home farm in Madison Township and attended the district schools of his home locality. Since 1898 he has been engaged in the furniture business, and also carries a general line of other goods, including glassware, silverware, rugs, carpets, sewing machines and jewelry.

In 1898, Mr. Wertenberger was joined in marriage with Miss Lizzie R. Rettig, who is a daughter of Peter and Eva Rettig, well known farmers of Madison Township. Mrs. Rettig died on the home farm in Madison Township in 1908, but Mr. Rettig survives and resides on the farm. Mr. and Mrs. Wertenberger began housekeeping in Arlington. They have one child: Marvin E. They are both members of the Lutheran church of Arlington, in which Mr. Wertenberger is superintendent of the Sunday-school.

SAMUEL S. STOVER, deputy probate judge of Hancock County, O., and one of the representative citizens of Findlay, was born October 5, 1885, on a farm in Amanda Township, Hancock County, and is a son of John L. and Emma J. (Snyder) Stover. They had three children: Jessie M., Samuel S. and Morris L. John L. Stover died on a farm in Allen Township, Hancock County, April 29, 1892, but is survived by his widow.

Samuel S. Stover was reared on the farm and attended the district schools of the township and the public schools of Findlay, after which he spent twelve years working in the oil fields. In February, 1909, he assumed the duties of deputy probate judge, receiving the appointment from Probate Judge Dorsey.

Mr. Stover was united in marriage with Laura B. Reimand, who is a daughter of Philip Reimand. Fraternally he is a member of the Odd Fellows and the Knights of Pythias.

RICHARD N. LEE, M. D., one of the leading physicians and surgeons of the southwest part of Hancock County, O., is a prominent citizen of Mt. Blanchard, of which place he has been a resident for twelve years. He was born in Jackson Township, this county, and is a son of Noah and Mary (Sampson) Lee.

Noah Lee was born in Amanda Township, Hancock County, O., August 15, 1845, a son of Richard and Lydia (Wyant) Lee, both of whom were natives of Fairfield County, Ohio. Richard Lee came to Hancock County in 1830 and entered a tract of land from the Government, on which he settled in the following spring. He died in 1856 at the age of forty-eight years. Of his eleven children, his son Noah was the youngest. He married Mary Sampson, a daughter of Nicholas and Eliza Sampson. The Sampsons lived on a farm adjoining that of the Lees, and at the time of marriage, Mary Sampson was twenty years of age. After his marriage Noah Lee rented the Houck farm, near Houckstown, and after living thereon for some seven years he purchased it, thereby becoming the owner of 146 acres of land. To this he added from time to time until he now owns 260 acres of some of the best farm land in Hancock County. His wife died on the homestead on August 20, 1881. She had been the mother of seven children.

Richard N. Lee, who was the third child of his parents in order of birth, was reared in Jackson Township and attended the common and high schools of Arcadia. During the years 1892-3-4 he taught school. In 1895 he began the study of medicine, reading under two of the leading physicians of Findlay. From under their instruction he entered Starling Medical College at Columbus, where he was graduated in 1898, and in May of that year he established himself in practice at Mt. Blanchard. Dr. Lee also attended school at the New York Post-Graduate School and Hospital in 1907. He has been very successful in general practice, and there have been special occasions when he restored to health patients for whom there seemed to be little hope. He has thus won public confidence in his professional capacity and is personally esteemed and held in high regard as a useful and progressive citizen.

On June 15, 1898, Dr. Lee was married to Miss Sylvia Marquett, who was born in Madison Township, Hancock County, Ohio. They have two children, Ruth M. and Robert J. Dr. Lee and family are members of the Methodist Episcopal church at Mt. Blanchard. He has been active in public affairs and in 1899 consented to become a member of the town council. He is identified fraternally with the Modern Woodmen, the Odd Fellows and the Knights of Pythias, being a Past Grand of the Odd Fellows.

WILLIAM R. RUMMELL*, proprietor of the flourishing furniture, stove and upholstery business located at Nos. 116-118 East Sandusky Street, Findlay, is one of the representative business men of the city. He was born at Findlay, Ohio, September 2, 1860, a son of David and Mary (Reed) Rummell, and he is a grandson of Jacob Rummell, who was born in Germany, in 1792, who was the first of this branch of the family to come to America. Grandfather Rummell was an early settler in Mt. Pleasant, Iowa, and followed his trade of brick mason and contractor for many years, dying in Findlay, in 1879. He was respected as a good and useful citizen by all who knew him.

David Rummell, son of Jacob and father of William R. Rummell, was born in Columbiana County, O., in the year 1830. He followed the occupations of chairmaker and brick mason. In 1848 he came to Hancock County and continued to work at his combined trades until 1875, when he established himself in the furniture business at Findlay. He proved a successful business man, his enterprise combined with honorable methods bringing their reward in a comfortable degree of prosperity that ranked him among the well-to-do citizens of the town. He took an interest in public affairs and was a man highly respected in the community, serving for a number of years as a member of the city council and also on the board of education. He was married in 1851 to Mary Reed, who was a daughter of William Reed, of Leetonia, Columbiana County. Their family numbered four children, namely: Ellen M., Jesse B., William R. and George B.

William R. Rummell received his educational training in the public schools of Findlay. He began his industrial career at the age of fifteen, becoming clerk in his father's furniture store. During the years that followed he familiarized himself thoroughly with every detail of the business, and in 1888, thirteen years after his industrial initiation, was admitted to partnership, at which time the firm name of D. Rummell & Son was adopted. The elder Rummell died in 1897, since which time, William R. Rummell has continued the business alone, having considerably increased its size and prestige. The store, equipped with a large and select line of furniture, stoves, etc., is now one of the most popular business establishments of the city, and every year sees the business increase, as the result of the straight-forward, honorable, methods adopted years ago by the father and since continued by the son.

Mr. Rummell is identified fraternally with the Odd Fellows, Elks, Knights of Pythias, and the Junior Order of United American Mechanics. In politics he pays allegiance to the Republican party, while religiously he belongs to the Methodist Episcopal church.

In Allegan County, Michigan, in 1882, Mr. Rummell was married to Miss Nancy E. Bowman, who died March 8, 1908. Her father was

William Bowman. She is survived by three children: Karl R., Maud B. and Mary C. The family home is at No. 409 E. Lincoln Street, Findlay.

JOSEPH WORST, who owns 160 acres of some of the finest farm land to be found in Madison Township, has lived on this place for sixty-two years and is one of the best known and most respected citizens of this section. He was born in Stark County, O., March 16, 1848, and is a son of Israel and Anna (Maner) Worst.

The parents of Mr. Worst were born in Germany and after they married they came to America and settled in Stark County, O., and from there came to Hancock County in 1849. Here they entered forty acres of land in Madison Township and the father developed a good farm on which he lived until his death, which occurred in 1890. The mother survived but one year longer.

Joseph Worst attended the district schools in boyhood whenever his father could spare him, and as soon as he was old enough he became the home farmer and remained with his parents until his marriage. He started housekeeping on a farm quite near the one which he now owns but shortly returned to the old homestead and has lived here practically all his life. He carries on general farming and stock raising.

Mr. Worst was married January 30, 1870, to Miss Mary Isenbarger, of Madison Township, Hancock County, a daughter of Arnold and Susan Isenbarger who were natives of Columbiana County, O. Mr. and Mrs. Worst have had five children, namely: John, who married Maggie Eibling, of Washington Township, Hardin County, O.; Effie, who died at the age of three years; Edward; Frank, who married Catherine O'Roark of Blanchard Township, and has one son, Richard; and Donna, who resides at home. Mr. Worst takes no very active part in politics but he is a good citizen and shows his worth when any question comes up in regard to the general welfare of his neighborhood. He believes in good schools and good roads.

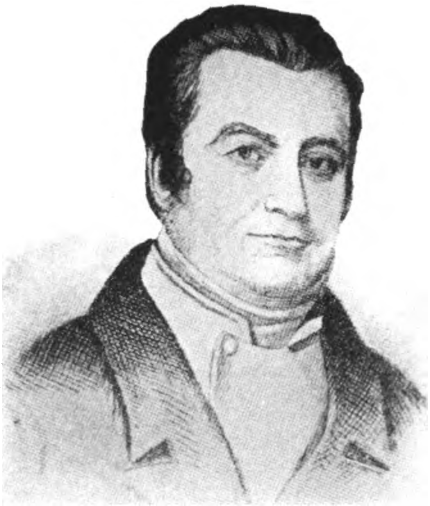
ROBERT LEFFLER KING, one of the leading men of Big Lick Township, a justice of the peace and the owner of one of the good improved farms in this township, belongs to one of the old and substantial families of this section of Hancock County, O. He was born at Springfield, O., August 24, 1863, and is a son of R. Q. and Hattie (Danforth) King. R. Q. King, father of R. L., was born at Tarlaton, O., August 13, 1832, and is a son of David King who purchased the farm owned by his grandson in 1849. R. Q. King resides in Springfield, O. He was married in early manhood to Hattie Danforth, a native of New Albany, Ind., who died in 1907. Five children were born to this marriage: D. Ward, Thomas D., Robert L., Almena A., and Madge C., the second and last named being deceased.

R. L. King traveled through the west for several years, working at farming part of the time. February 2, 1887, he began to live on and improve this land which had first come into the King name thirty-eight years before, but had never been even cleared. After taking up his residence on this land he cleared, fenced it and began to prepare it for cultivation. The draining of this land was the cause of a great deal of trouble, the county having put through e

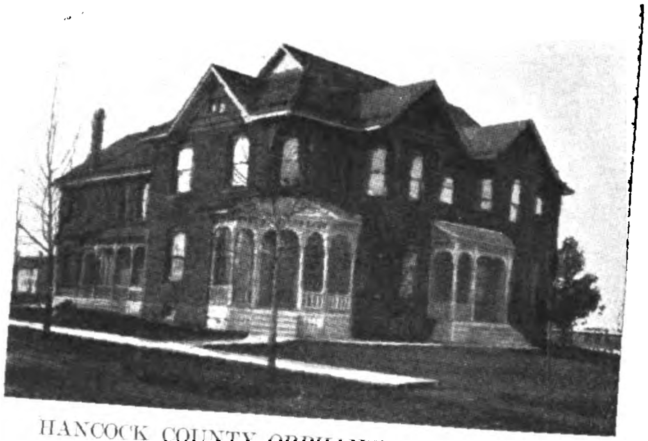
n

ne

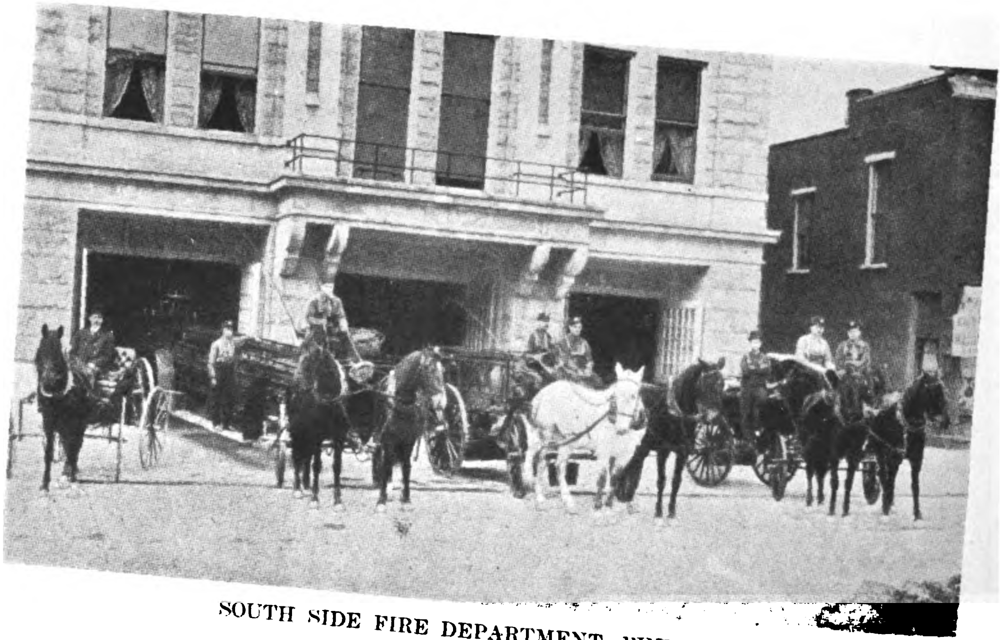
jor
the
on
ome
ore.
ing
nced
The
great
ough



COL. JAMES FINDLAY



HANCOCK COUNTY ORPHANS' HOME, FINDLAY



SOUTH SIDE FIRE DEPARTMENT, FINDLAY

two ditches, from one of which came considerable litigation. Mr. King, however, finally succeeded in getting all necessary draining completed and has found himself in possession of a farm of exceeding fertility. Being enterprising and progressive, he has made other improvements, erecting buildings, which have no superior in the township.

On December 18, 1908, he lost his large barn by fire, a conflagration which was deemed the largest that ever occurred in Hancock County, outside of Findlay. At the present writing he is rebuilding and the new structure will be practically indestructible, being largely made of concrete and vitrified blocks. It is his object to make all his buildings equally fireproof and he has completed his horse stable and granary and also two very large vitrified block and cement silos. He has very practical ideas and has adopted many modern methods in conducting his farming and stock raising. In 1891 Mr. King was married to Miss Lola Askam, who was born and reared at Vanlue, Hancock County, and they have three children: Edwin A., Hamlin C. and Jessie.

ROBERT P. TWINING, one of Liberty Township's large farmers and well known citizens, resides on what was formely known as the old Bushong farm, which is now owned by Mrs. Twining—a tract of 221 acres, lying in both Liberty and Portage Townships, Hancock County, O. He was born in Hancock County, August 27, 1860, and is a son of Eleazer and Eliza Jane (Sharp) Twining.

Eleazer Twining was born in Bucks County, Pa., and was seven years old when he accompanied his parents, Joseph and Mary Twining, to Hancock County, where they spent the remainder of their lives. Eleazer Twining was married twice, his first wife being a Miss Thomas and his second wife Eliza Jane Sharp, who was a daughter of Philip Sharp. Their family consisted of five sons, two of whom are now deceased. Eleazer Twining spent the greater part of his life in Marion Township, Hancock County, where his death occurred when he was fifty-four years of age. His burial was in the Van Horn Cemetery. The mother of Robert P. Twining died at the age of thirty-eight years and her burial was in the Pleasant Hill Cemetery. They attended the Methodist Episcopal and the Evangelical churches. In politics Mr. Twining was a Republican but cared nothing for office, his time being fully occupied with farming and work at the carpenter's trade.

Robert P. Twining obtained his education in the public schools of Hancock and Wood Counties and then worked for two years at the plough. He finally decided to learn the bricklaying trade and has done a large amount of first class brick work through this section, building many schoolhouses, foundations and furnaces. After marriage he lived at Findlay for six years and then moved to a farm for two years, later returning to Findlay. Subsequently he came back to Mrs. Twining's farm, which he has managed ever since.

On October 12, 1887, Mr. Twining was married to Miss Florella Bushong, a daughter of Isaac and Nancy (Cooper) Bushong, and they have one son, Carl, who is a member of the graduating class of 1911 at Findlay College. He is talented in music and is proficient on the cornet. Mr. and Mrs. Twining are members of the Church of God. In his views on politics he is a Republican but does not call himself a politician, merely a good citizen who cheerfully upholds the laws by his ballot.

Isaac Bushong was born in Portage Township, Hancock County, a son of David and Elizabeth Bushong. Isaac Bushong enlisted for service in the Civil War, entering Company B, 21st O. Vol. Inf., and while in the service was so injured that he lost his voice for six months but finally recovered and at the close of the war returned to Portage Township. He died at the age of fifty-six years and his burial was in Maple Grove Cemetery. He married Nancy Cooper, a daughter of Amos Cooper of Portage Township. She died at the age of fifty-four years. They were leading members of the Methodist Episcopal church, in which he was a class leader for some years. He owned over 220 acres of land and was a man of high personal standing in Liberty and Portage Townships and served in numerous township offices.

JAMES W. KIRKBRIDE*, deceased, formerly one of Findlay's capitalists and a highly esteemed citizen, was very prominently identified with the business interests of this section and for a number of years was one of the largest independent oil producers in Ohio, and also owned oil leases and properties in other states. He was born November 22, 1854, at Ogdensburg, New York, a son of Joseph and Sarah (Nugent) Kirkbride, natives of England.

James W. Kirkbride was thirteen years of age when he accompanied his father in the family removal to Warren County, Pa., where his education was completed, after which he assisted his father for four years in contracting and building oil derricks and tanks. In this way he gained a thorough knowledge of the oil business, of its methods and its possibilities, and as soon as he had accumulated a little capital he made not unsuccessful ventures for himself. He became interested in the Butler and Armstrong County oil fields, in Pennsylvania, and remained there until 1880, when the finding of a rich oil field in Alleghany County, New York, attracted him to that point. In 1886, when the promising field was opened in Hancock County, Ohio, he established his permanent home at Findlay, investing a large amount of capital in oil leases as well as in the lumber regions, and for years afterward he carried on both a retail and wholesale lumber business. He became a power in this line as well as in the oil industry.

The drilling of the wonderful Kirkbride oil well, in November, 1894, in which successful enterprise he was associated with his brother, and which was the largest well ever opened up in the Ohio fields, is easily recalled, as it was a most notable event in oil history. Mr. Kirkbride had never entered into the wild speculation which so greatly affected the fortunes of many of the oil men of the day, his natural business caution and unusual foresight preserving him from the failures which on every side marked the want of wisdom of many one-time capitalists. He owned stock in some of Findlay's financial institutions and owned numerous mining properties in the West. He had shown his faith in the future of Findlay by also investing largely in real estate here and he erected the handsome Kirkbride Block. As a citizen he was public spirited and open-handed. Personally he was held in affection by a devoted family, and in highest esteem by friends and associates. He was a worthy member of the Howard Methodist Episcopal church.

In 1877 Mr. Kirkbride was married to Miss Amy C. Carson, of Parker, Pa. They had three children: Charles W., who is largely interested in the oil business, and resides at 202 Hancock Street; Amy G., the wife of C. H.

Messinger, a prominent business man of Toledo, Ohio; and Harry C., who resides with his mother in her beautiful residence situated at No. 941 South Main Street.

MARION SWARTZ, who owns an excellent farm of eighty acres, which is situated in Jackson Township, Hancock County, Ohio, was born in Hardin County, Ohio, September 3, 1867. His parents were Samuel and Sarah Elizabeth (Obenoure) Swartz.

Samuel Swartz was born in Muskegon County, Ohio, January 27, 1839, and died in Kansas in 1890. He married Sarah Elizabeth Obenoure, who was born in Ohio, January 12, 1847, and resides at Pacific Grove, California. They had five children, namely: Marion; Clarence E., who died when aged twenty-four years; Mertie Ann, who married Silas Jefferson, who belonged to the same branch of the Jefferson family as did President Thomas Jefferson (they live in California where he is a stock buyer); Alberta Ellsworth, a railroad man in California, who married Ida Linguist; and Lydia Melvina, who is the wife of Arthur Durba, a barber at Fresno, California.

When Marion Swartz was eight years old his parents moved to Henry County, and as the family home continued there for eleven years, he secured his schooling there. Removal was then made to Kansas and while living there he worked out on farms by the month for his father, and after reaching his majority he engaged in farming for himself for two years. In October, 1891, he went on a trip that extended through Colorado, New Mexico, Arizona and California, after which he went back to Kansas for two years. In 1894 he again visited California and remained in the far west for five years. He then returned to his native state to marry, and then went back to California for one year more. In 1901 he came to Hancock County and bought his present farm from Mary Vanhorn. This land was entered from the Government on July 10, 1837, by George Goodell, and the legal papers bear the signature of President Martin Van Buren. Mr. Swartz has done considerable traveling and has seen many other parts of the country than the one in which he was born, but when he decided to locate permanently he found no section quite equal in every way to beautiful Ohio. Many other natives of this noble State have felt the same way and for that reason her citizenship, natural born, is of so high and loyal a type.

In 1900 Mr. Swartz was married to Miss Elizabeth Winemiller, a daughter of J. J. Winemiller and wife, who live in Jackson Township. Mrs. Swartz is the second born in a family of three children, having a brother and a sister: Frank, who is a farmer in Henry County, where he owns eighty acres of land; and Minnie J., who is the wife of Frank Alger, who owns eighty acres of land in Jackson Township. Mr. and Mrs. Swartz have two children, Ervin T. and Ama Marcella. Mr. Swartz has been a member of the Methodist Episcopal church at Houcktown since he was twenty-two years of age and for about the same time has been a member of the fraternal order of Woodmen of the World, No. 333, California. He votes with the Republican party but the only township office he has ever accepted was that of school director. He is numbered with the reliable and representative men of Jackson Township.

HILTON A. VICKERS*, M. D., who has been engaged in medical practice at Findlay, Ohio, since 1893, has become identified with the interests of this city to a very large degree and numbered among his personal as well as professional friends, the representative people of the community. Dr. Vickers was born June 18, 1857, at Old Plainfield, Ohio, a son of the late Dr. W. H. Vickers, for many years a physician in Coshocton County, Ohio.

Dr. Hilton A. Vickers attended the schools of his native place until he was eighteen years of age, when he went to Indiana, where he alternated going to school with working on a farm, in Henry County. Subsequently he taught school in that State for several years, after which he returned to Ohio and entered upon the study of medicine with Dr. A. E. Walker, a well known physician of Old Plainfield, and in 1884 he was graduated from the Columbus Medical College. For eight subsequent years, Dr. Vickers engaged in a general practice at Evansburg, and for two years at Deshler, in Henry County, and then came to Findlay, where he has been established ever since. He is a member of the Hancock Medical Society and of the Northwestern Ohio Medical Association, and keeps closely in touch with all matters of scientific research in the profession to which he has devoted his life. His office with its library and expensive equipments which successful modern practice demands, is located in the Goodwin Block on North Main Street, Findlay. In 1881, at Old Plainfield, Dr. Vickers was married to Miss Sallie Smith, and they have an interesting family. Their comfortable home is situated at No. 804 Franklin Avenue. Politically, Dr. Vickers is a Republican and fraternally he is a Mason.

DANIEL MATTER, a successful farmer residing in Section 31, Orange Township, where he owns ninety-four acres of excellent land, was born in this township, November 12, 1862, and is a son of Christian and Regina (Stauffer) Matter.

Christian Matter was born in Richland County, O., and in childhood was brought to Allen County by his parents, who were Samuel and Elizabeth Matter. He grew up there and married Regina Stauffer and ten of their eleven children were born in Allen County. They were as follows: John, Samuel, Daniel, Noah, Peter, William, Theopholis, Sarah, Anna, Katherine and Henry, Daniel being born during a period of eighteen months that the family lived in Hancock County near the Allen County line. The parents of the above family were members of the Reformed church. In politics the father was a Democrat. His death occurred July 10, 1895, at the age of fifty-six years and his burial was at Bluffton. His widow and youngest son reside on the old home farm.

Daniel Matter attended the district schools in boyhood and youth but after he was nineteen years of age his time was mainly given to farming and about the time he reached his majority he began to manage property on his own account, in Allen County. After his first marriage he came to Orange Township and for two years operated the farm on which D. D. Hilty resides, after which he came to his present place, where he erected the fine buildings which add to the attractiveness and value of his property. He carries on general farming and also is interested in breeding cattle. For some three years he has been pumping oil from six wells on his land and they are still producing.

Mr. Matter was married the first time to

Miss Lizzie Jane Stratton, a daughter of Asa Stratton, of Bluffton, O. She died December 3, 1901, and was buried at Bluffton, She was a member of the Methodist Episcopal church. Two children survive her: Grace May, who married Clyde Klingler, of Allen County, and they have one daughter, Rhea; and Edith Lillian, who resides at home. His second marriage took place on July 8, 1903, to Miss Lillie E. Welsh, of Hardin County, O., and they have had two children: Don Edgar, who died at his home, aged eight weeks, and Daniel Emerson. They are members of the Methodist Episcopal church, in which he is very active, being a trustee and steward and superintendent of the Sabbath school. He is a Democrat in politics, served six years as township constable, also was on the school board and is at present a trustee of the township. Mr. Matter is one of the representative men of this section and one of the busiest. In addition to cultivating his own farm he also operates another of eighty acres which he leases.

HON. S. N. E. PRIDDY*, president of the Buckeye Traction Ditcher Company, of Findlay, of which city he has been a prominent business man for almost twenty years, was born February 21, 1844, in Van Wert County, O., a son of Thomas D. and a grandson of William Priddy. The latter was the pioneer of the family in Ohio, a native of Virginia and a son of a Revolutionary patriot. On the maternal side Mr. Priddy is a descendant of General Warren of the Revolutionary War.

S. N. E. Priddy attended the district schools in Van Wert County and grew to manhood on the home farm. The opening of the Civil War aroused in him the old patriotic spirit of his great-grandfather and September 11, 1861, saw him an enrolled soldier in Company H, 15th O. Vol. Inf., in which he served faithfully until he was obliged to accept his discharge on account of physical disability. His spirit, however, was not quenched nor his enthusiasm dampened, and in November, 1863, when his health had been re-established, he re-enlisted in his old company and regiment and continued to face all the many hardships and dangers of his command until the close of the Rebellion. His military record is one of which he may well be proud.

After the close of the war Mr. Priddy returned to the home farm and remained there until 1871, when he embarked in the business of supplying railroad ties for one of the great transportation lines then creeping across the country, and two years later went into the milling business and for about a dozen years operated a saw mill, a grist mill and a planing mill, at Middlepoint, O. He there became a man of affairs, honored and respected by his fellow citizens, serving on the city council and school board and for five successive years was elected mayor. In 1890 Mr. Priddy transferred his interests to Findlay and in this city identified himself with both public and private interests.

Mr. Priddy was married in 1872 to Miss Elizabeth Price, a daughter of John and Rachel (Coslett) Price, of Middlepoint. Of their children, Thomas D. is a drainage contractor now in business at New Orleans; John E. is a prominent attorney of Findlay, and has his offices in the Commercial Bank Building and his residence at No.

121 Baldwin Avenue; Edgar is a mechanical expert with the Buckeye Company of Toledo, O.; Vernon is now general manager of the Western branch of the Review of Reviews at Chicago, Ill.; Miss Edith is the one daughter. Mr. Priddy and family reside in one of the most beautiful homes in the city, at No. 1109 South Main Street, Findlay. They are affiliated with the Methodist Episcopal church. In his politcal views, Mr. Priddy, with his sons, is a Republican.

J. M. RUCKMAN, M. D., one of the leading medical practitioners of Jenera, Ohio, was born April 24, 1872, in Big Lick Township, Hancock County, Ohio, and was there reared to maturity. After obtaining a common school education in Big Lick Township, he taught five years in the schools of the county, then spent two years at the Ohio State Normal at Ada, and in 1900 graduated from the Starling Medical College of Columbus, Ohio. He then came to Jenera, Ohio, where he has established an extensive practice, and enjoys the confidence and esteem of his fellow citizens to the fullest extent. Dr. Ruckman was married June 4, 1901, to Caroline Edwards, a native of Findlay, Ohio, who taught for five years in the schools of Hancock County. Of their union have been born: James Merritt; Kenneth Edwards; and Lucia Adele. Dr. Ruckman is an adherent of the Democratic party in politics and is a member of the Hancock County and the North Western State Medical Societies.

CHARLES E. VANHORN, one of Amanda Township's prominent citizens, successful farmers and stockmen, resides in Section 7, Amanda Township, Hancock County, O., eight miles southeast of Findlay, where he owns 165 acres of valuable land. He was born in Amanda Township, April 17, 1843, and is a son of Charles and Sarah (Twining) Vanhorn.

Both parents of Mr. Vanhorn were born and reared in Bucks County, Pa. They came to Hancock County in 1833 and the father bought 200 acres of land in Amanda Township, at $4 an acre, which is almost beyond belief, considering the price of the same land at the present time. Later he again invested, in 1835, purchasing fifty-four acres situated in Section 6, in the same township. The parents lived in this township during the remainder of their lives, the father dying in 1881, at the age of eighty-one years and the mother passing away in 1879, when aged seventy-six years. They had ten children, namely: George W. and J. M., both of whom are deceased; Robert; Mary, who is Mrs. Aurand; Martha, who married a Mr. Marvin; Phebe, who is Mrs. Grove; Harrison; Sarah, who is Mrs. Caruthers, lives at Findlay; Charles E.; and John.

Charles E. Vanhorn obtained his education in the township schools and helped his father on the farm. He has devoted his life to agricultural pursuits. For forty-five years he has been engaged in buying and shipping livestock and wool and in carrying on general farming.

Mr. Vanhorn was married first in 1866, to Miss Elizabeth Smith, a daughter of Rev. Smith, of Amanda Township. She died in 1894, and was survived by two daughters, Agnes and Garnet. Agnes is the wife of

Joseph Shull, of Amanda Township, and they have six children: Edith, Esther, Ethel, Russell, Harold and Erma. Garnet married George Davis, of Findlay, and they have one daughter, Mary. Mr. Vanhorn was married second to Mary M. Sutherland, of Amanda Township. Mrs. Vanhorn is a member of the Methodist Episcopal church. Mr. Vanhorn is one of the leading Republicans of his township and has served for ten years in the office of land appraiser.

WILLIAM F. BLOOM*, county recorder of Hancock County, Ohio, was born in Union Township, Hancock County, November 13, 1864, and is a son of Jacob and Mary (Zelert) Bloom.

Jacob Bloom was born in 1841, in Tuscarawas County, Ohio, and died in Hancock County in 1872. He married Mary Zelert, who is a sister of Professor Zelert. They had four children.

William F. Bloom was educated in the public schools of Union Township and the Normal School at Ada, Ohio. He engaged in teaching for a time and then returned to agricultural pursuits, which he continued until he was first elected to his present office, in November, 1901, on the Republican ticket, by a plurality of 349 votes. It is very evident that he gave satisfactory service, as when he was re-elected in 1904, it was by a plurality of 1,470 votes, a remarkable increase. The people of Hancock County speak well of him and in these days of corruption in public office in many sections, they feel well contented with their officials who have many times proved their honesty and integrity. Mr. Bloom owns a well improved farm of fifty acres which is situated in Orange Township, Hancock County.

Mr. Bloom married Miss Mary Ford, a daughter of John Ford, of Hancock County, and their children are: Jacob P., Edgar B., and William F., Jr. Mr. and Mrs. Bloom are members of Grace Episcopal church. Their pleasant home is situated at No. 414 North Cory Street. He is an Odd Fellow.

HENRY WILLIAM BRINKMAN, who is engaged in general farming on a tract of sixty-five acres, located in Section 15, Cass Township, was born April 23, 1842, in Hanover, Germany, and is a son of Lewis and Dorothy (Trader) Brinkman.

Lewis Brinkman and his wife were both born in Hanover, Germany, and spent their entire lives in their native country. They were the parents of one child, Henry William, the subject of this record. The mother of our subject first married Henry Agathon, by whom she had the following children: Frederick Coberg, Henry, Detrich, Dora, and Lenora, all of whom are now deceased.

Henry W. Brinkman grew to maturity in Hanover, Germany, where during his early manhood he worked in a factory, and in 1880 he came to the United States. He had saved some money before coming to this country, but the expenses of the trip, together with sickness, swallowed up the greater part of it, leaving him just sufficient capital with which to buy a cow and some furniture. For the first two years after coming here he worked out by the day at seventy-five cents per day. In 1890, however, he purchased from L. Stacey his present farm, where he has since carried on general farming, and has made all the improvements on his property, having erected a good substantial house and other buildings.

Mr. Brinkman was first married in Germany in 1868, to Margrethe Schuhlenber, and of this union were born five children, namely: William; Henry, who married Emma Lyons, and has three children, Floyd, Bertha and Ruth; Minnie, who is the wife of Frank Harrold, and has six children, Clara, Alice, William, Edward, Clarence, and Floyd; and John and Sophie, who are deceased. Mrs. Brinkman died in 1880, and Mr. Brinkman formed a second union with Marie Flinert, who died about three and a half years after their marriage. On August 20, 1884, Mr. Brinkman married Minnie Nickie, a daughter of Fred and Mary (Doll) Nickie, both natives of Germany. Mrs. Brinkman was born January 18, 1863, in Hancock County, Ohio, the other children being: Carl, Sarah, Mary, Dora, Josie, and one that died in infancy. Mrs. Brinkman's father subsequently married Augusta Cuert, which union resulted in the following issue: Augusta, Lena, Emma, Anna, Martin, and Elva, the three last mentioned being now deceased. The father died in January, 1892.

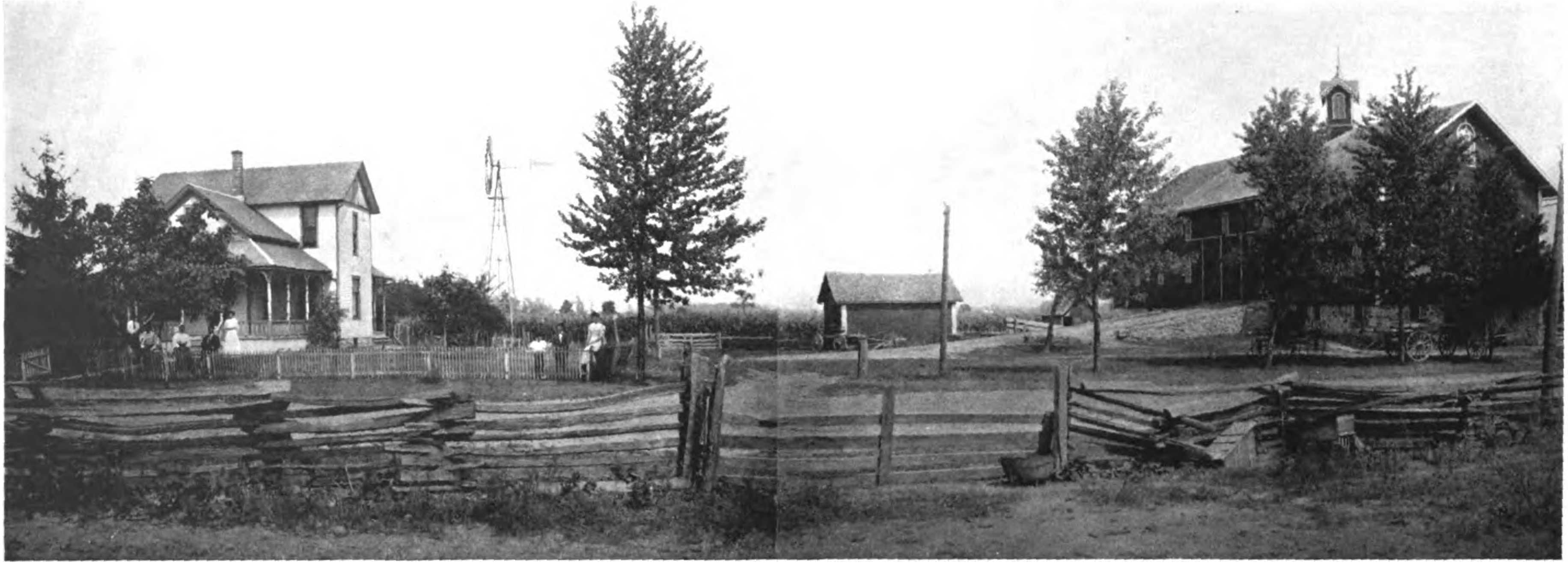
Mr. and Mrs. Brinkman have had the following children: Charles, who died in infancy; Edward, who married Ethel Wilkes; Nora, who is the wife of George Drake; Lewis; Dora; Emma; Lydia, and Augusta. Mr. and Mrs. Brinkman are members of the Lutheran church.

JACOB MELVIN ROBINSON, a successful farmer and representative citizen of Pleasant Township, Hancock County, O., where he owns eighty acres of valuable and well improved land, was born in Blanchard Township, Hancock County, June 28, 1864, and is a son of Samuel H. and Elizabeth Deter Robinson.

Samuel H. Robinson was born in Columbiana County, O., in 1833, and is a retired resident of McComb. He was a mere boy when his father, Jacob Robinson, moved to Wood County, O., near Hoytsville. The latter later moved to McComb, where he and wife died. Samuel H. Robinson lived in Hancock County, near the Putnam County line, for forty years, and owned a farm of seventy acres in Blanchard Township. Before the railroad was built through McComb, he engaged in teaming for some years for the firm of Snyder & Barney, of McComb. He has always been a respected and useful citizen. He married Elizabeth Deter, who died in 1902, at the age of seventy years. They had three sons born to them: John Wallace, who is a farmer in Union County, near Marysville, O.; Peter Amos, who is engaged in the poultry business at McComb, and Jacob M., of Pleasant Township.

Jacob Melvin Robinson was educated in the public schools of Hancock County. Farming has been his main business. His unmarried life was spent in Pleasant Township. After marriage he lived for five years in Blanchard Township and then removed to Richfield Township, Henry County, where he resided for eleven years.

In the spring of 1905 he purchased his farm from his father and immediately began improving the property, building his comfortable and attractive residence and a modern, well proportioned barn, with dimensions of 60 by 36 feet and with a crib and wagon shed that is 16 by 36 feet in dimensions. He carries on general farming and stock raising, following modern methods and considering the use of improved farm machinery one of the necessary



RESIDENCE OF OZIAS E. BENINGTON, BIG LICK TOWNSHIP adjuncts. In politics he is a Democrat, but takes only the interest of a good and intelligent citizen in public affairs, entertaining no desire to hold office.

In 1889 Mr. Robinson was married to Miss Ida Alwilda Bowers, a daughter of Daniel Bowers, of Blanchard Township, and they have three children, namely: Harold Clinton, aged eighteen years; Carrie Alta, aged fifteen years; and Velzora Marie, aged ten years, all of whom are being given educational advantages.

OZIAS E. BENINGTON, who owns seventy-one acres of valuable farm land which is situated in Section 3, Big Lick Township, Hancock County, O., ten and one-half miles east of Findlay, is one of the successful farmers of this neighborhood. He was born February 27, 1861, in Seneca County, O., and is a son of George S. and Amanda (Spragg) Benington.

George S. Benington was born in Carroll County, O., November 10, 1825, and died on our subject's farm, May 27, 1910. He married Amanda Spragg, who was born in Pennsylvania and died in 1905. They had eleven children: Ignatius, Susan, Calvin J., Uriah C., Libbie, Ozias E., Jane, Benson A., Alice, Belle, and Cora.

Ozias E. Benington remained at home helping his father until he was nineteen years of age, in the meanwhile obtaining a common school education. When he started out for himself, he bought a farm in Indiana on which he lived for a few years and then came to his present property in Big Lick Township. He carries on a general farming line which includes the growing of fruit and the raising of stock for his own use.

In 1886, Mr. Benington was married to Miss Eliza A. Taylor, who was born in Washington Township, Hancock County, and is a daughter of Robert Taylor, and they have six children: Ralph, Genevria, Grace, Dewey, Harold and Taylor. In politics, Mr. Benington is a Republican and keeps well posted on public matters, but he has never sought office. He is a practical man and finds his time well employed in looking after his own business affairs.

SAMUEL E. RENNINGER*, plumber and gas fitter, at Findlay, Ohio, is the head of the firm of S. E. Renninger & Co., at No. 602 South Main Street, and has been established in this line in this city since October, 1903. Mr. Renninger was born on a farm in Liberty Township, Hancock County, Ohio, October 20, 1876, and is a son of William and Sarah (Emerson) Renninger. William Renninger was a prosperous farmer in Liberty Township for many years and then retired to Findlay, where his death occurred September 21, 1897. His widow is still living.

Samuel E. Renninger was reared on the home farm and after leaving school worked for eleven years in the oil fields as a pumper for the Ohio Oil Company, after which he learned his trade with a plumber at Findlay and for several months was in partnership with A. E. Powell, and then bought his partner's interest. He has a first class establishment in which he employs from four to eight men and takes contracts and separate orders for plumbing, steam, gas and hot water heating and sheet metal working.

Mr. Renninger was married to Miss Anna R. Brady, a daughter of Mathew Brady. She was born in Ross County but was reared in Hancock County. They have two children, Mary Ilene and Margaret Elizabeth. Mr.

Renninger is a member of the order of Ben Hur and of the Modern Woodmen of America.

WILLIAM W. COLE, who owns 143 acres of fine land, lying in Section 22, Big Lick Township, Hancock County, O., on the New Haven turnpike road, ten miles east of Findlay, is one of the representative and reliable citizens of the township. He was born near Portersville, Mich., December 27, 1856, and is a son of John W. and a grandson of James Cole.

John W. Cole was born in Ashland County, O., in 1831, a son of James Cole, who was born in Delaware, where he married. With his wife he came to Ashland County, O., where his children were born, and then moved to Big Lick Township, Hancock County, where the remainder of his life was spent. To James Cole and wife the following children were born: William, John, Dickson, Benjamin, James, Roland, Andrew, Raymond, David, Elizabeth, Milla, and Wilminer. John married Sarah McCree, who was born in Scotland and was brought to America when eight years old by some relatives of the name of Allen, and with them she lived until they died, in 1851, when she married John W. Cole. A large family of children were born to them, namely: James, William, Elmer A., Charles W., John J., Dilman D., Benjamin, Raymond C., Lemuel, Ralph, Irvin, Jennie, Marietta, Minta and Janet and Rosett, twins, and almost the whole family still survives. The father died in 1905, and the mother in 1879.

For a few years in boyhood, William W. Cole attended the local schools and then went to the West for a few years and after he returned, settled on his present farm in Big Lick Township and here has ever since carried on general farming and stock raising with much success.

In 1881 Mr. Cole was married to Miss Ellen Bright, who was born and reared in Big Lick Township, a daughter of William Bright, and thirteen children have been born to this marriage, namely: Cloys, who is in the real estate business in Kansas; Ray C.; Carl M.; Florence, who married Charles Myers, a farmer in Washington Township; and Jessie, Aura, Edna, Mary, Nana, Esther, Glenna, Myrtie and Vertie. The two youngest, Myrtie and Vertie, were twins and they died at the age of 6 weeks from measles. Mr. Cole and family belong to the Methodist Episcopal church. He is a Republican in his political views.

HENRY SWINDLER ROLLER, whose valuable farm of eighty-nine acres lies in Section 31, Washington Township, Hancock County, O., is one of the enterprising and representative men of this part of the county. He was born on his father's farm in Big Lick Township, Hancock County, April 20, 1862, and is a son of Michael and Elizabeth (Swindler) Roller.

Michael Roller was born in Ashland County, O., and was twelve years old when he accompanied his parents to Hancock County. His father, William Roller, was born in Pennsylvania and was one of the early land agents in Ashland County and came from there to Big Lick Township, Hancock County, where he had entered large tracts of land. He had eight children: Wilson, Michael, George, Agnes, Mary, Lucinda, Charlotte and Susan. All are now deceased. The daughters married and the larger number of them moved farther west.

When Michael Roller came with his parents to this section, Findlay was a scattered village of log houses surrounding the court house. He led a busy life from boyhood and for four years chopped down trees and cleared the farm of brush before he started to cultivate it. Later he introduced many improvements and kept the farm of 160 acres left him by his father intact for his own children and died on it at the age of sixty-five years. He married Elizabeth Swindler, who lived to be seventy-eight years of age. She was born in Jefferson County, O., and was a capable housewife and good mother. In the early days before her husband's means could provide other ways of transportation, she did not hesitate to carry produce to market on horseback and thus do her part in adding to the family income. Eight children were born to Michael and Elizabeth Roller, namely: William, who lives in Wood County, O.; Sarah, who is the widow of Allen Spahr; Mary; Philena, who is the wife of Jefferson Huffman; George; Ida, deceased, who was the wife of Samuel Taylor; Henry S.; and Lorena, who is the wife of Edward Vickers.

Henry S. Roller grew to manhood in Big Lick Township and attended the country schools as opportunity offered, although he began hard work on the farm when comparatively young. There was always a job of clearing or wood cutting awaiting him when farm work was not pressing and before the days of the oil boom he hauled and sold wood through Findlay. He remained at home for ten years after his marriage and continued to farm and raise stock there until the spring of 1895, when he bought a part of his present farm in Washington Township and later bought forty more acres, the remaining portion. He has remodeled the buildings and put everything in fine condition here and is numbered with the successful general farmers of this neighborhood.

Mr. Roller was married October 1, 1885, to Miss Margaret Ellen Vickers, a daughter of George and Malissa (Jolley) Vickers, the former of whom was born in Cass Township, Hancock County, a son of James Vickers, of England, who came here as a pioneer. George Vickers died October 27, 1866, aged thirty years. His widow, who survives him, was born in Columbiana County, O., and lost her parents when she was only nine years old, they dying within two weeks of each other. She was reared by a cousin and came to Hancock County when aged eighteen years and was married to George Vickers in 1859. Three children were born to that union: Mary E., who is deceased; Sarah Jane, who is the wife of George Roller; and Margaret Ellen, who is the wife of Henry S. Roller. Mrs. Roller was born on the old Vickers homestead in Cass Township. Mrs. Vickers was married a second time, to the late Mark Taylor, who died in April, 1906, leaving one daughter, Cora Dell, who is the wife of Roy Cook, of Findlay. Mr. and Mrs. Roller are members of the Methodist Episcopal church. In politics he is a Democrat.

JEREMIAH FERGUSON*, senior member of the firm of Ferguson & Son, architects and builders, with offices in the Niles Block, Findlay, has been actively engaged in business here for the past twenty years. He was born in Franklin County, Ohio, in 1860, his birthplace being within the present limits of the city of Columbus. His parents were Samuel and Catherine (Nazworthy) Ferguson.

Samuel Ferguson was a mechanic. Before coming to Findlay, in 1864, he, together with his brother, John Ferguson, had served as soldiers in the Civil War. It happened that both a Franklin County and a Hancock County regiment was short of men and the two companies were combined in one regiment, the men becoming well acquainted. The Fergusons were men of sterling character and made friends from Hancock County who urged them to come to Findlay after the expiration of their terms of service. There was still another brother, Joseph Ferguson, in the service at this time, but he did not live to return, being killed at the battle of Perryville, Kentucky. Samuel and John Ferguson acted upon the suggestion of their Hancock County friends and comrades and thus Findlay acquired several more excellent citizens. Samuel Ferguson was a woodworker and John Ferguson was a blacksmith and both were carriage workers and they purchased what is now Reimund Brothers carriage shop and conducted it together for some years. Their father, James Ferguson, accompanied his sons to Findlay, where the remainder of his life was passed. Samuel Ferguson is still a resident of Findlay but his wife died in 1900.

From the age of four years Mr. Ferguson has been a resident of Findlay. After his period of school attendance was over he served an apprenticeship in his father's carriage shop, after which he learned the carpenter's trade and went into building and designing. Few names in this line are better known in Hancock County than that of Jeremiah Ferguson and when a particularly imposing or pleasing structure is being erected at Findlay, the admirer can be pretty sure to find that the firm of Ferguson & Son are the designers if not also the builders. To Mr. Ferguson is credited: the Kirkbride Block; the S. L. McKelvy Block; the First Church of God; the United Presbyterian and the Central Church of Christ, all at Findlay; all the buildings at Riverside Park; the Country Club House, together with probably 500 fine private residences. He drew the architectural plans for many of the buildings and blocks, and designed all the three churches mentioned.

Mr. Ferguson was married at Findlay, Ohio, to Miss Mary J. Bryan, a daughter of Joseph Bryan, and they have had five children: Roy, who is in partnership with his father; Ruth; Hazel, who is the wife of John Alesch, of Findlay; Clark, who died when aged eleven months; and Harold. Mr. Ferguson was bereaved of his estimable wife, July 3, 1909. He has never been active in politics but is numbered with the earnest and useful men of the city, one who may be depended upon to ever give support to law and order.

DR. WILLIAM F. LEHR, who has been engaged in the practice of medicine at Arlington, Ohio, since the fall of 1899, was born June 13, 1870, in Hardin County, Ohio, and is a son of Daniel and Susan P. (Rentzer) Lehr. His father was born near Potsville, Schuylkill County, Pa., and came to Delaware, Ohio, to attend the Ohio Wesleyan University. It was here he met the mother of the subject of this sketch and they were married in 1855, and continued living in Delaware, where Mr. Lehr worked at his trade of saddler till about 1868, when they moved to Hardin County, Ohio. Here Mr. Lehr engaged in farming till his death, which was accidental, in 1875.

Dr. William F. Lehr was reared to manhood in Wyandot County, Ohio, where he attended the district schools. At the age of seventeen he began a course of study at the Ohio Normal school at Ada and after completing a four years' course, taught in the country schools of Wyandot County for five terms. He then entered the Eclectic Medical College of Cincinnati, Ohio, from which he graduated with the class of 1899. That same fall he embarked in the practice of medicine at Arlington, Ohio, where he has established an extensive practice and enjoys the confidence and esteem of his fellow citizens.

Dr. Lehr was married August 5, 1896, to Miss Salena J. Carey, of Marseilles, Ohio, a daughter of Archabald and Ellen (Gorden) Carey. She was also a teacher, having taught in the town and country schools six years. She was born in Demorestville, Canada, and came with her parents to Marseilles, Ohio, in 1882. Dr. and Mrs. Lehr are members of the Methodist Episcopal church, of Arlington, Ohio, of which he is at present one of the trustees.

GEORGE C. MONTGOMERY, general farmer, resides on his well cultivated farm of eighty acres which is situated in Section 21, Portage Township, Hancock County, O. He was born in Portage Township, October 10, 1861, and is a son of George W. and Mary (Chase) Montgomery.

George W. Montgomery was well known all over Hancock County as an auctioneer. His first wife, the mother of George C., died when her son was but six weeks old. Mr. Montgomery married for his second wife, Dorothy Culp, who proved a good mother to his children.

George C. Montgomery was reared in Portage Township on his father's farm and attended the country schools. For one year after marriage he made his home in McComb but continued to carry on farm operations on the homestead, his father's other duties demanding his attention in other directions. For the following five years Mr. Montgomery operated his father-in-law's farm and then bought and moved onto the present place in the spring of 1901 and immediately started to make improvements. He has remodeled the house and erected other necessary structures, rebuilt fencing, attended to the orchards—in fact turned it into a model farm.

Mr. Montgomery was married December 25, 1894, to Miss Jennie Wagoner and they have had four children: Wellington; a babe that died unnamed; Pearl; and Howard, who lived but five months.

EVERETT H. COATES*, plumber and steam fitter, engaged in business at No. 521 South Main Street, Findlay, Ohio, is a thoroughly experienced man in his line of business, with which he has been more or less connected since he was sixteen years of age. He was born on a farm in Blanchard Township, Hancock County, Ohio, June 25, 1878, and is a son of Norman G. and Mary E. (Callison) Coates.

Norman G. Coates was born in Pennsylvania and came to Hancock County, Ohio, with his father, Hiram G. Coates, when a boy. Until he was twenty-five years old, Norman G. Coates remained on the farm and then went to St. Louis, Michigan, where he was engaged in a hardware business for fifteen years and then came to Findlay. In 1883 he started the present plumbing business, in 1894 admitting his young son to a partnership, and the firm of Coates & Son continued until 1907, when

Mr. Coates sold out his interests to his partner and moved to Texas, where he still resides. He married Mary E. Callison, who was born in Indiana and died in October, 1908.

Everett H. Coates was one year old when his parents moved to St. Louis, Michigan, where he attended the public schools and after coming to Findlay, he attended Findlay College for four years. Although college bred, Mr. Coates has had no desire to adopt a professional career, preferring to engage in a business where skill and mechanical effort is necessary to success. A natural aptness for this line of work has been of assistance to him and he probably is considered one of the most reliable plumbers, gas fitters and installers of modern heating systems in the city and controls a large portion of the public's important work.

Mr. Coates married Miss Lillian Campfield, a daughter of the late William H. Campfield, who was a prominent cement contractor and builder at Findlay. The mother of Mrs. Coates was Henrietta Watts. Mr. and Mrs. Campfield had four children, Mrs. Coates being the third born. Mr. Coates is a member of the Knights of Pythias and also of the Elks.

OSCAR WISE, who conducts a hardware business at Mt. Blanchard, O., and is general manager of The People's Telephone Company, having lines in Hancock, Hardin and Wyandot Counties, is one of the representative men of the place. He was born in Knox County, O. His father, who was a native of Ashland County, died in Richland County in 1905. His mother was born in Richland County and still resides there.

Oscar Wise was reared at Butler, O., and attended school there. When he was only eleven years old he started to learn the tinner's trade, probably having inherited mechanical skill from his father, who was a carriage maker. Mr. Wise continued to work at his trade until he was thirty-six years of age, eighteen years of that time having charge of the tin shop and hardware store, and in 1892 began to be interested in the telephone business. By 1895 he had completed telephone lines over ten counties and had connected 154 towns. In 1900 he started a telephone system at Arlington, where he remained for three months and then came to Mt. Blanchard and organized a company in 1902 and up to this time there was no telephone system in Hancock County south of the corporation lines of Findlay. He has the management of the telephones at Forest, Kirby, Wharton, Arlington, Jenera, New Stark, Mt. Cory and Rawson, his company having over 1,900 telephones in operation. The service is entirely satisfactory. Mr. Wise is recognized as a very useful citizen and has been a member of the city council since 1909. He is identified with Lodge No. 519, F. & A. M., at Mt. Blanchard, in which he holds the office of senior warden.

WILLIAM BATTLES, a member of a well known family of Orange Township, Hancock County, O., and the owner of a valuable farm of 120 acres, situated in Section 20, was born in the center of Orange Township, February 13, 1848, in the old log house his father had erected there. His parents were Asa and Catherine (Raimer) Battles.

Asa Battles was born in 1815, in Mercer County, Pa., and came to Ohio with his father, Brier Battles, who settled and died in Trumbull County. When Asa Battles left Trumbull County he had a horse and wagon, a few tools and $200 in money. He came to Hancock County and bought 200 acres of land in the center of Orange Township. It was a wild region at that time, forests stretching in every direction and in order to find space on which to build his first primitive home, Mr. Battles had to fell forest trees. This first 200 acres was purchased from Alexander Ewing. Later he added other tracts until he was one of the large land owners of this section, having 680 acres, enough to give each of his living children a farm. He practically cleared and fenced all of this land during his life time. He was a man of considerable importance and in those early days, as his house was centrally located, it was often used for the transaction of township business and as a voting place. In 1867 he replaced the log cabin with the house that still stands on the farm which is occupied by one of his sons. He married Catherine Raimer, who was then a resident of Allen County, O., although born in Germany. She accompanied her parents, Thebault and Sophia Raimer, and they reached America after a voyage of forty days, subsequently settling in Allen County, O.

To Asa Battles and wife the following children were born: John, Alfred, William, George, Edward, Eliza Jane, Asa, Jesse, Freeman, Robert and Harry. The two eldest sons died in the army during the Civil War. Edward lives on the old homestead and William resides in Orange Township not far distant. The father of this family died in November, 1904, and the mother in February, 1909. They were worthy and active members of the German Lutheran church and their burial was in the Thompson cemetery.

William Battles, the third member of the above family, attended the district schools in Orange Township, mainly in the winter time, until he was twenty years of age, and then assisted his father until he went to Iowa. Mr. Battles spent four years in that state and during this time he was married and one year later he returned to Hancock County and purchased his present farm in Orange Township, from the Thompson heirs. A large amount of improving had to be done before Mr. Battles was satisfied with the appearance of his home and all the buildings now standing are of his own erecting. He has thoroughly drained his land and has all of it under cultivation with the exception of four acres still in valuable timber. He carries on the usual pursuits of a general farmer, raises grain and hay, fruit and vegetables and enough stock for his own use.

Mr. Battles was married in Iowa, on January 14, 1867, to Miss Cordelia McConnell, a daughter of Alexander and Caroline (Raimer) McConnell. A family of seven children has been born to them, as follows: Jennie, who married Howard Schold and they have one son, Leonard; Jesse, who married Hattie Custer, and has one son, Walter; Maude, who married E. K. Chapman, and they have one daughter, Jennie C.; Minnie, who married Jacob Armstutz, and they have three children, Robert, Helen and Wilbur; and Bertie, Grover and Edith, all at home. The family is well known in this section in all its connections and is held in high regard. Mrs. Battles is a member of the Evangelical church, to which Mr. Battles liberally contributes and also attends. In politics he is a Democrat but at present holds no political office. Formerly he served as school director.

JOHN V. HARTMAN, M. D.,* physician and surgeon at Findlay, Ohio, where he has been established since 1904, was born on his father's farm in Allen Township, Hancock County, Ohio, March 10, 1877, and is a son of Jasper N. and Mary Ellen (Skinner) Hartman.

Dr. Hartman had the undeniable advantage of a childhood and boyhood on a farm and the family continued to live there until the death of the mother, in 1885, when removal was made to Findlay, where John V. was soon enrolled a student in the grammar schools. For seven years after leaving school he engaged in teaching and in the meanwhile did his preparatory medical reading, subsequently entering the Cleveland Homeopathic College, where he was graduated in the class of 1904. During his last half year he filled the position of resident physician at the Cleveland Maternity Hospital, and from his period of graduation until he embarked in practice, he served as an interne in the Cleveland City Hospital. Dr. Hartman not only possesses the knowledge to make him successful in professional work, but also the enthusiasm and the peculiar gifts and personality which belong to every man of medicine who has reached any degree of eminence. He probably has the largest and most substantial practice of any physician in Hancock County. Every emergency finds him ready and through his knowledge and skill he has effected some remarkable victories over disease. He keeps thoroughly abreast with the times and belongs to the Hancock County and the Northwestern Ohio Medical Societies.

Dr. Hartman was married to Miss Zoe Codding, who was formerly a teacher in the Findlay High School. They have one daughter, Mary Ellen. The father of Dr. Hartman died at Findlay in 1906. His offices are in the Niles Building, where he occupies an elegantly appointed suite of rooms. He is identified with the fraternal order of Knights of Pythias.

WILLIAM E. SNYDER, one of the most prominent and best known men in Hancock County, a retired dry goods merchant and a large stockholder in the Glass Block Department Store of Findlay, Ohio, resides in a beautiful home at No. 321 West Sandusky Street. Mr. Snyder was in the dry goods business in Findlay from 1865 until 1890, conducting a store at the old White Corner, where the Buckeye Bank building now stands, and until a recent date held large interests in the Snyder Brothers Dry Goods Company of Richmond, Indiana, and in the D. D. Snyder Company of Minneapolis, Kansas. He was born at Greenville, Mercer County, Pa., January 4, 1836, a son of Simon A. and Elizabeth (Couldron) Snyder, who settled in Hancock County in 1848, coming overland in wagons from Pennsylvania, as there was but one railroad in the State of Ohio at that time. Simon A. Snyder was a carpenter, cabinetmaker and bridge-builder and lived for many years on a farm in Union Township, but late in life moved to Findlay, where his death occurred.

William E. Snyder was twelve years of age when the family came from Pennsylvania and he well remembers many thrilling incidents of the overland journey, and at that time saw his first railroad train. He resided on the home farm for about two years, and when fourteen years of age came to Findlay to become a clerk for the Henderson-Patterson Dry Goods Company, of which the J. S. Patterson Dry Goods Company is the successor. Incidentally it may be remarked that Mr. J. S. Patterson, who is still in the dry goods business in Findlay was the only "boss" Mr. Snyder ever had, as, after working for the Henderson-Patterson Company for about six years, and when but twenty years of age, Mr. Snyder formed a partnership with B. B. Barney in a general store at McComb, Hancock County, under the firm name of Barney-Snyder Company. This store was one of the pioneer department stores, selling almost everything imaginable. In 1865 Mr. Barney and Mr. Snyder opened up the old White Corner dry goods store in Findlay, and later on, with Charles Foster, who was then governor of Ohio, and a brother, D. D. Snyder, he conducted a store at Fostoria, Ohio, and for several years continued to be interested in all three establishments. In 1870 Mr. Snyder bought out the interests of Mr. Barney, and continued to conduct the store at Findlay under the firm name of W. E. Snyder Company.

Mr. Snyder was married to Sarah H. Duduit, a native of Hancock County, whose father, Frederick Duduit, was born in Southern Ohio, near the Ohio River, and was a member of the well known Duduit family, natives of France who are prominently mentioned in all histories of this State. Mr. and Mrs. Snyder have had two children: Reginald C., who married Miss Alice Mack, daughter of the well known Sandusky editor, has one child, Alice, and lives in Coshocton, Ohio, being proprietor of the Coshocton Age; and Bernice Fredericka, living at home.

Mr. Snyder was the owner of the hotel building known as the Joy House, formerly the property of ex-Senator Joy, at the corner of Main and West Sandusky Streets, which has been remodeled and converted into the Glass Block Department Store, and it was mainly through Mr. Snyder's efforts that this establishment was located in Findlay. He is the owner of a great deal of real estate, among which may be mentioned the Tavern Hotel building. He is prominent in Masonry, having attained to the 32nd degree, and now holds the office of Worshipful Master of Lodge No. 227, F. & A. M. of Findlay. Personally, Mr. Snyder is a very congenial gentleman, numbering his friends by the hundreds, and, although retired from active business affairs, is still regarded as one of Findlay's most prominent and public-spirited citizens.

SAMUEL EDWIN MOORHEAD, one of Portage Township's best known citizens, resides in his comfortable farm home which stands in Section 31, three miles southeast of McComb, O. In partnership with his two sons, Fred and Thaddeus E. Moorhead, he owns 172 acres of valuable and well improved land, situated in Sections 30 and 31, Portage Township. He was born on this farm, September 25, 1850, and is a son of Andrew and Letitia (Bell) Moorhead.

Andrew Moorhead was born in Westmoreland County, Pa., and died in Hancock County in 1884. He was brought to Stark County, Ohio, by his parents and his father, John Moorhead, died there. Andrew Moorhead came to Hancock County in 1836, one of six brothers who settled here between 1834 and 1836. Andrew Moorhead entered the land on which his descendants live and in order to reach it and take possession, he had to break his way through the forest and blaze a path for future return journeys to civilized regions. This path ran four miles through a dense wilderness. This land has never since been out of the Moorhead name. Both parents of Samuel E. Moorhead spent the remainder of their lives here, the mother dying when her son was but thirteen years of age.

Samuel Edwin Moorhead was reared on the farm that has caused his father so much toil and hardship to secure and as he grew to manhood he assisted largely in its development and with the exception of seven years, during which he lived in Liberty Township, has always resided here.

Mr. Moorhead married Miss Agnes Marshall, who was born at Slatington, Pa., and died here in 1884. She was a daughter of James Marshall, a native of Scotland, who came to Portage Township in 1868 and became a substantial farmer. Eight children were born to Mr. and Mrs. Moorhead, namely: Mabel M., who survives her husband, W. P. Jacobs; Grace, who is the wife of Charles Ream, of Fort Wayne; Andrew Clyde, who is engaged as a pumper in the oil fields, and lives in Portage Township; Frederick F., who resides on the homestead; Bert M., who is a farmer, with a family, and lives in Indiana; Adrian O., who lives with his family at Toledo, O.; Samuel C., who resides with his family in Indiana; and Thaddeus E., who remains on the homestead and with his brother, Fred F., operates the farm. He is married and has a family.

Mr. Moorhead is a Republican in politics and for sixteen years served as a member of the county election board. At the time of writing he is his party's candidate for county commissioner. Being a man of property, intelligence, good judgment and high personal standing, it would appear that he is particularly well qualified for an office of so much importance.

O. E. NEELEY*, junior member of the firm of W. E. Crater & Co., grocers, with business quarters in the Crater Block, occupying Nos. 630-632 South Main Street, Findlay, Ohio, has been a resident of this city since 1890. He was born on a farm in Big Lick Township, Hancock County, Ohio, May 24, 1879, and is a son of David E. and Caroline (Conner) Neeley.

David E. Neeley was born in Hardin County, Ohio, but he became a resident of Findlay, where he died April 24, 1909. He married Caroline Conner, who was born in Auglaize County, Ohio, and died in 1886.

O. E. Neeley was reared on the farm and gained his book education in the country schools. After coming to Findlay he became a clerk in the grocery house of Barnett & Boyd, then engaged in business on the same corner that is the site of the Crater Block, and for three years before entering into the present firm, conducted a grocery business under the firm style of

Harris & Neeley. Mr. Neeley has been identified with the present firm as junior partner since January 1, 1908. This firm has a high commercial rating, dealing only in standard goods and handling exclusively the products of the best manufacturers. The firm enjoys liberal patronage, which it entirely deserves.

Mr. Neeley was married to Miss Blanche Shaffer, a daughter of A. J. Shaffer, of Findlay, and they have had two children, Milton Edward, who died in infancy, and Martha Heloise. Mr. Neeley is affiliated fraternally with the Knights of Pythias and the Odd Fellows. He takes only the interest of a good citizen in politics, desiring no offices for himself and casting his vote for the candidates he feels assured will best carry out the laws and thus ensure the general welfare.

J. L. STEINER, superintendent of the Rawson public schools, has been a resident of this pleasant town since 1907 and has made both professional and personal friends since assuming the duties of his present important office. He was born near Grand Rapids, in Kent County, Mich., April 29, 1874, and is a son of P. D. and Anna Steiner, of near Bluffton.

P. D. Steiner was born in Wayne County, O., and is a son of Peter Steiner, who was a native of Germany. P. D. Steiner has always followed agricultural pursuits and resides on his farm in Orange Township, Hancock County O. He married Anna Leatherman, who was born in Bucks County, Pa. She died May 13, 1882, in Kent County, Mich.

J. L. Steiner was eight years old when his father moved from Michigan to Medina County, O., then to Wayne County and then to Richland Township, Allen County, then to Orange Township, Hancock County, where he attended the country schools for a time and later the public school known as the Center School, near Bluffton, and from there he entered the Bluffton High School, where he continued for two years. After teaching four years in Orange Township, Hancock County, and Monroe Township, Allen County, he spent three years in the Ohio Normal University at Ada, where he graduated in 1900. He also graduated at Elkhart Institute, which is now Goshen College, Goshen, Ind., in three courses. Since then he has been engaged in teaching and superintending schools in Indiana and Beaverdam, O. He has devoted his life to educational work and has gained recognition as a thoroughly qualified teacher. Under his management the Rawson schools have made very noticeable progress and his plans for the future include still further advancement of educational standards.

Mr. Steiner was married in 1900, to Miss Lydia Metzler, who was born in Mahoning County, O., and died at her mother's home near Orville, O., August 10, 1910, aged thirty-one years and two months, leaving three children: Loren Franklin, Mary Evelyn, and Harold Metzler. Mr. Steiner is a member of the American Mennonite church, attending services near Bluffton. He also is active in church and Sunday school services at his place of residence. He is the active leader in educational progress in the schools and town.

JACOB L. METZLER, who conducts a high class grocery and queensware store, is one of the most prominent business men and highly esteemed citizens of Findlay, Hancock County, Ohio, and has been identified with the business interests of this city since 1887. He was born May 16, 1850, on a farm about five miles west of Findlay, Ohio, in Liberty Township, and is a son of Jacob and Harriet (Lenhart) Metzler. The parents of our subject were both natives of Mahoning County, Pa., and were there reared, educated and married. In 1849 they came to Hancock County, Ohio, and located on a farm in Liberty Township, where the father died in 1864. His widow subsequently removed to Johnston County, Mo., where she resided until the time of her death.

Jacob L. Metzler was about fourteen years old when he accompanied his widowed mother to Johnston County, Mo., where he resided until after her death, when he went to Colorado, where he was for two years interested in mining. He then engaged in the lumber and mercantile business which he carried on successfully for six years, and in 1887 came to Findlay, Ohio, where he entered the employ of his brother, H. H. Metzler, who for ten years operated the business now owned by our subject. The business was established in 1877 by H. H. Metzler and Mr. Hyatt (deceased), who was the owner of the Hyatt Block, in which the store is located. In 1890 Mr. Metzler bought the business from his brother, and has since continued to operate it with a high degree of success, commanding an extensive patronage from the residents of Findlay and its surrounding community. Mr. Metzler stands very high in the business circles of Findlay and has been president of the Findlay Retail Grocers' and Butchers' Association since 1900, and president of the Central Delivery System of Findlay since its organization. He has held the position of trustee of The Toledo Biscuit Co. since its organization and is also one of its directors.

Mr. Metzler's home is located at No. 219 Defiance Avenue, where he has about one acre of ground, and devotes his spare time to breeding fancy poultry, making a specialty of the noted French Houdan chicken. He is an acknowledged judge of fine chickens, and has a pair of the Houdan breed, which won the first prizes at the last show of the Cleveland Poultry Association, the hen taking first prize and the rooster second. This same hen won the trophy cup as the highest scoring bird in the Findlay Poultry show, and his poultry has often won prizes at the Hancock and Wood County Fairs.

Mr. Metzler was married in Hamilton County, Iowa, to Adella Moulton, and they have five children: Mabel, Ethel, Clifford, Cuvier, and Fauntine. Mr. Metzler is a prominent member of the Elks and the Maccabees.

CONRAD HENRY HOGREFE, who is engaged in general farming on a tract of 80 acres located in Section 13, Cass Township, Hancock County, Ohio, was born October 4, 1840, in Hanover, Germany. His parents were both natives of Germany. The father died before our subject was born and the mother—Mary Hogrefe—also died in her native country. They were the parents of the following children: William, who died in Iowa; Fred, who died in the southern army; Sophia, wife of Amiel Garber of Chicago, Ill.; Christopher, residing in Illinois; John, deceased; and Conrad H., the subject of this sketch.

Conrad H. Hogrefe was reared in Hanover, Germany, and there attended the common schools, after which he worked out by the day. In 1872 he came to America and located in Findlay, Ohio, on August 26th. The following day he went out to the Henry Kuhlman farm in Portage Township, and there spent the following winter. He worked for two months in a stone quarry at $1,25 per day and in the spring located in Portage Township on the John Cooper farm, which he rented for nine years. The house on this farm was an old log building, to which a frame addition had been added and had formerly been a school, and in this home Mr. Hogrefe began his career in this country. He later rented the Charles Tailor farm, which is located east of Van Buren in Allen Township, for three years; then for seven years he rented the Jasper Franks farm in Cass Township, and in 1890 bought his present farm of 80 acres at $40 an acre. During the first year, the place was farmed by his children, and he and his wife located here the following year. There was a little four-room house and barn on the place, and in 1893 Mr. Hogrefe built a seven-room frame house, remodeled the barn, dug a cellar and in various other ways made improvements on the place. Mr. Hogrefe has continued to follow general farming here with much success, and what he has attained in worldly goods has been entirely due to his own efforts, and those of his estimable wife. She spent many days working with him in the fields, and the first year on the place, bound the grain, while he cradled it.

Mr. Hogrefe was married October 1, 1870, in Hanover, Germany, to Mary Kuhlman, who was born February 15, 1843, in Hanover, and is a daughter of Henry and Mary (Frehking) Kuhlman. Her parents both came to this country, the father's death occurring the year after locating here. They were the parents of the following children: Mary, wife of our subject; William, of Allen Township; Fred, deceased; Dora, deceased, wife of William Sharninghouse; Herman, a resident of Blanchard Township; George, deceased; Sophia, the wife of Detrich Scheele, of Blanchard Township; and Anna, who is the wife of Henry Hector, of Putnam County, Ohio.

Mr. and Mrs. Hogrefe are parents of the following children: Henry, Emma, Jane, and Lena. Henry, who was born in Germany, was nine months old when his parents came to this country. He married Elizabeth Doke and they have four children, Esther, Gladys, Clara, and Otto. He resides on a farm of 80 acres in Cass Township. Jane, deceased, was the wife of William Fisher and the mother of one daughter, Mary. Lena married John Vogelsong and has two children, Lester and Emma. They live in Cass Township. The family holds membership with the Lutheran church. Mr. Hogrefe is politically a Democrat and has served on the school board of Cass Township.

CHARLES ALGE,* a member of the well known firm of Alge Brothers, who are general stone, concrete and brick contractors of Findlay. Ohio, was born September 14, 1862 in Martinstowns, Hancock County, Ohio, and is a son of Joseph and Theresa (Beck) Alge.

Joseph Alge was born in 1839 in Baden, Germany, where he spent the first eighteen years of his life. He then came to America, located in Martinstown, Hancock County, Ohio, where he first purchased 40 acres of land. In 1871 he located in Findlay Township where he resided two years, and then removed to Eagle Township. In 1888 he came to Findlay, where he was living at the time of his death, February 16, 1910. He was one of the prominent pioneer contractors of Findlay, and was engaged in that business in Hancock County previous to the war. He erected many of the dwellings and business blocks of Findlay, the last one on which he and our subject contracted having been the Karst Block of Findlay. Shortly after locating in the county Mr. Alge invested his money in farm lands, and at the time of his death was the owner of two tracts of land, consisting of 268 acres. The mother of our subject is still living.

Charles Alge was nine years old when his parents removed from Martinstown to Findlay, where he was reared and attended the common schools. He learned brick and stone masonry with his father, who was one of the leading contractors of the county, and since 1884 has been engaged in general stone, concrete and brick contracting in partnership with his brother Joseph, operating under the firm name of Alge Brothers.

Mr. Alge was first united in marriage with Lena Savage, who died leaving three children: Gertrude, Charles, and Lester. He subsequently married Elizabeth Goodman and of their union were born, Annie, Agnes, Albert, Lawrence, Richard, and Bernard. The religious connection of the family is with the Roman Catholic church.

HENRY C. BRINKMAN, an enterprising citizen and well known general farmer of Allen Township, Hancock County, Ohio, is the owner of a farm of 75 acres located about one and a quarter miles east of Van Buren on the Ridge Road. He was born in Germany, February 1, 1871, and is a son of Henry W. and Margaret Brinkman, the latter of whom died when the son Henry was quite young.

In 1881 Henry Brinkman came to the United States with his father, who first resided at Findlay, Ohio, for a short time. They subsequently removed to Van Buren, where the father worked two years on the Mnason Adams farm in Allen Township. In 1883 he rented a farm in Allen Township, and they continued their residence on that farm until 1893, in which year Mr. Brinkman removed to a farm of 65 acres, which he had purchased in Cass Township. He married for his second wife, Minnie Nique, and they now reside on the farm in Cass Township.

Henry Brinkman was reared from his tenth year in Allen Township, and obtained his education in the district schools of that vicinity and at Van Buren. He follows general farming and is one of the prosperous and enterprising citizens of Allen Township. He is fraternally a member of the Knights of Pythias, No. 473, and of the Knights of the Maccabees. He has served as a member of the Allen Township school board, and is a member and trustee of the United Brethren church of Van Buren, Ohio.

In 1894 Mr. Brinkman was united in marriage with Emma J. Lyon, a daughter of E. S. Lyon. Mrs. Brinkman taught school for twenty-one months, three months in Hancock County and eighteen months in North Baltimore. Of their union have been born the following children—Floyd E., Bertha M. and Ruth Anlize, the last named being just one month old when the agent was canvassing for the history.

W. E. HOUCK, who is prominently identified with the manufacturing interests of Hancock County, is manager of the Findlay branch of the Boss Manufacturing Company, which, in the line of its specialties, is the largest plant in the country and commands a larger output than any other in the world. Mr. Houck was born at Houcktown, Hancock County, Ohio, April 6, 1873, and is a son of William and Elizabeth (Smaltz) Houck.

William Houck is one of Hancock County's venerable and revered citizens. He was born March 4, 1827, and is a son of Jacob F. Houck, who gave his name to the town of Houcktown and was prominent in the early affairs of the county.

W. E. Houck grew up a farmer boy, but an intelligent and ambitious one. After leaving school he taught the country schools for seven years and then came to Findlay, and since 1901 has been in business here and has been with the Boss Manufacturing Company since 1893, when the plant was established in Findlay. The home plant of this company is at Kewanee, Illinois, and branch factories are located at Findlay, Ohio; Galesburg, Monmouth and Peoria, Illinois; New York City; Fort Wayne and Bluffton, Indiana; and Van Wert, Ohio. The Findlay plant is devoted exclusively to the manufacture of cloth gloves and mittens. The output of the factories include cloth gloves and mittens and corn husker gloves. Additions are being made at the present writing (1910) to the Findlay plant which will greatly increase production and facilitate business. A brick addition 50 by 140 feet, three stories in height, will soon be completed, in which will be installed an automatic sprinkling system as a fire protection. From 100 to 150 more employes will be required by this plant under the new conditions, 460 now being employed, these being mainly girls, 360 machines being operated. Mr. Houck is also president of the Hollerback Piano Company, manufacturers of pianos, the factory being located on Western Avenue, Findlay.

Mr. Houck married Miss Lorena Gail Prindle, of Hancock County, and they have two children, Hugh and Mary. Mr. Houck is an active and public-spirited citizen and during 1908 and 1909 was a member of the board of public service at Findlay. He is identified with the Masons, the Elks and the Knights of Pythias.

JACOB SLUPE, one of the old and prominent citizens of Pleasant Township, Hancock County, O., where he owns 200 acres of very fine land, was born in Columbiana County, O., February 21, 1830, and is a son of Solomon and Anna (Shatter) Slupe.

Solomon Slupe was born in Pennsylvania, where his father died when he was seven years of age and when brought to Columbiana County by neighbors, he was an orphan. He grew to manhood there and finally bought a tract of thirteen acres of land. He married Anna Shatter there, who was also born in Pennsylvania, and in the fall of 1844 they moved to Seneca County, O., where he died in 1866. He first purchased forty acres of land fourteen miles southeast of Tiffin and later added forty acres, owning eighty acres when he died, the greater part of it being timber land. His widow moved from Seneca to Hancock County and later to Putnam, where she died at the home of a daughter, in 1875. Of their nine children, Jacob was the eldest, the others being as follows: Elizabeth, who was the wife of David Metzler and both died in Indiana; Samuel, who lived and died on a farm adjoining that of Jacob Slupe, and married Sarah Ewing, who is also deceased; Martha, who was the wife of John Huffman, and died in Cleveland, O.; Mary, who was the wife of David Van Sickle, and died in Putnam County, as did her husband, they expiring within thirty-six hours of each other; Nancy, who is the widow of Adam Cosner, and resides in Putnam County; Hannah, who died in Elkhart County, Ind., was the wife of John Felthouse; and Solomon and Noah, twins, both of whom survive. Solomon is a farmer in Putnam County and married Lillie Edgington. Noah has never married and for twenty-nine years has lived at Kansas City, where he is a carpenter and contractor.

Jacob Slupe's first instruction at school was confined to the German alphabet but later he was taught English and gained a fair district school education in Seneca County. In the fall of 1856 he was married and then bought forty acres of land situated eighty rods from the Portage Township line in Pleasant Township, which he later sold and subsequently repurchased. Four acres had been cleared and a cabin was on the place. Mr. Slupe has been a shrewd handler of farm property and several of his purchases have changed hands profitably several times. He bought eighty acres of William Bennett and sold the same two years later and bought John Wesley Smith's farm, one and three-quarter miles west, which he sold in 1864. In 1865 he purchased 120 acres and after he finished paying for this, purchased eighty more acres, of Jona Robinson, and 120 acres of William Hilkert. A small structure was on this land but in 1872 Mr. Slupe built his fine brick residence and a substantial barn but the latter was destroyed by fire and the present barn took its place. In all his operations Mr. Slupe showed patience and good judgment. When he acquired this land a large part of it was under water, scarcely any attempt having been made to drain it. He first put in lumber drains but later put down tile and converted all the waste land into rich soil and has now one of the most productive farms in Pleasant Township. Mr. Slupe is a self made man and all he owns he has earned through his own efforts. He is a carpenter by trade and when he first came to this section did a large amount of building and many of the houses and barns standing in Pleasant Township were put up by him. He witnessed many changes in the fifty-three years he has been a resident of Pleasant Township and has done his full share in bringing about improvements.

In the fall of 1856, Mr. Slupe was married to Miss Catherine Bechtel, who died in 1859. She was a daughter of Andrew K. Bechtel. One daughter was born to that marriage, Emma Jane, who died when four years old. Mr. Slupe was married a second time to a widow, Mrs. Eliza Shilling, who was a daughter of Joseph Kinsey, of Seneca County. She was a most estimable woman and was beloved by all who knew her. Her death occurred January 3, 1909, when she was aged seventy-three years, seven months and five days. Three daughters and one son were born to the second union, namely: Laura E., who is the wife of E. M. Orwig, and they have two children, Charles and Esta; Ida, who is the wife of Willard G. Haley, of near McComb, and they have children: Maud, Kale, Alice, George and Ruth; Simon Sylvester, who died at the age of ten years; and Ella, who is the wife of George C. Robinson, who assists Mr. Slupe in farming, and they have one son, Ralph J. Nominally Mr. Slupe is a Democrat but in local elections he usually uses his own good judgment and supports the man he considers best qualified for the office sought. For himself, Mr. Slupe desires no political prominence.

KARG BROS.,* a representative business firm of Findlay, Ohio, made up of three brothers, Fred J., Charles A. and Albert E. Karg, own and operate two meat markets and thus control a large part of the meat trade of the city, and also own a valuable farm of 160 acres in Marion Township, Hancock County. The meat business was established by their father, the late August Karg, who was the pioneer in this line at Findlay.

August Karg was born in Germany and after his school attendance was over he learned the butchering trade and worked at it in his own land for several years afterward. He then came to America and remained in the city of New York until 1850, when he came to Findlay, his sole capital at that time being $26, and the clothing he wore, having had the misfortune to be robbed of all his belongings while on a Lake Erie boat, at some point between Dunkirk, New York, and Sandusky, Ohio. Although he returned to Dunkirk and made inquiries, he was never able to regain possession of his effects. The loss was a more or less serious one to him at the time but it did not cause him to change his plans about going into business at Findlay, and in the same year he opened his shop and the present business is a continuance of the one he then founded. He became well known all over Hancock County and in early days it was his custom to do his own buying from farmers and they soon learned that while he was a shrewd business man he was always an honest one. He was thus held in universal respect. He remained at the head of the business until 1880, when he retired and turned his interests over to his four sons. His death occurred in September, 1904, and all of his seven children still survive, namely: Mrs. Elizabeth Klentsche, Fred J., August, Jr., Charles A., Mrs. Minnie Hull, Albert E. and William D.

Fred J. Karg was born at Findlay, September 4, 1854, and was educated in the public schools. When fifteen years old he entered his father's shop and learned the business. He married Miss Eliza A. Mills and they have one child, Eva. Mr. Karg is a member of the Knights of Pythias.

Charles A. Karg was born at Findlay, Ohio, January 13, 1860, and he gained his education in the Findlay schools. When fifteen years of age he went into his father's shop and learned the business with which he has been identified ever since. He married Miss Mary Best and they have three children, Carl, Fred and Esther. He is a member of the Knights of Pythias and the order of Ben Hur.

Albert E. Karg, the third member of the firm of Karg Bros., was born at Findlay, August 18, 1865, and after he was through with school he also entered his father's shop and learned the meat business. He married Miss Mollie Reimund and they have two children, Inez and Earl A. He is a member of the Knights of Pythias.

The present owners of the Karg Bros.' meat markets took charge in 1880, the fourth brother at that time having an interest which he sold in 1888. In 1887 the firm bought a farm of 160 acres in Marion Township and their slaughter-house it situated there, as they kill and dress all the meats they handle. They operate one store at No. 233 South Main Street and another at No. 229 North Main Street, their refrigerating and cooling plant being attached to the former store. They are all practical butchers and men of business capacity of a high order, men well qualified to handle an important and necessary part of a city's food supply.

DOUGLAS SPITLER, a prominent farmer and highly respected citizen of Allen Township, Hancock County, O., is the owner, with his wife, of 560 acres of productive farm land in Allen and Portage Townships, and resides on a tract of 162 acres just west of Van Buren, O. He was born January 15, 1858, on his present farm, which is the old Spitler homestead, and is a son of Samuel and Anna (Bretz) Spitler, both of whom were natives of Fairfield County, O. His parents were married in Fairfield County, and later moved to Crawford County, O., and in 1842 located on our subject's present farm, where they resided until the time of their death, his occurring September 26, 1886, and hers January 2, 1888.

Douglas Spitler has spent his entire life on his present farm and attended the schools of this district. He has always followed farming in a general way, and is one of the leading and influential agriculturists of the township.

Mr. Spitler was united in marriage with Lucy Rader, who was born in Pleasant Township, Hancock County, O., a daughter of Adam and Amelia Rader, prominent farmers of Allen Township, who resided on an adjoining farm. The father died in October, 1907, and the mother died December 31, 1902. The following children have been born to Mr. and Mrs. Spitler: Sylvia, who is the wife of Perry Dove, and the mother of two children—Virgil and Elsie; Anna, who married L. W. Baker, and they have one child, Burdette; Virgie; Troy; Florence, who married Clifford Davis and they have one son, Paul; and Clyde, and Harold. Mr. Spitler is a member and a trustee of the United Brethren church of Van Buren, O. His fraternal affiliation is with the Maccabees. Politically he is a Democrat, and he has served two terms as township clerk, two terms as township assessor, and the same length of time as trustee of Allen Township. Mr. Spitler and family reside in a fine frame dwelling which was erected in 1908, and he has also built three fine barns on the home place. Mr. Spitler's land is divided into six separate farms, four of which are located in Allen Township and two in Portage Township.

A. L. WORDEN, who owns 400 acres of fine farming land which is situated in Section 7, Liberty Township, Hancock County, Ohio, was born on this farm which has always been in the Worden name since it was secured from the Government. He is a son of A. C. and Rachel (Hall) Worden.

A. C. Worden was born at Albany, New York, and was the only child of Robert D. and Sally Worden, the former of whom died in 1819, when his son was but one year old. His widow returned to her own people in Champaign County, Ohio, where she continued to reside until her death in 1879. A. C. Worden obtained his education in the Findlay schools and then engaged in farming in Liberty Township, securing wild land which he cleared himself and at one time owned 353 acres. He improved his property and all the buildings now standing were erected during his lifetime. His death occurred March 19, 1891, and his burial was in the Worden Cemetery. He married Rachel Hall, who died January 17, 1892. Her father was Absolom Hall, a native of Harrison County, Ohio, and sixteen children were born to this marriage, four of whom still survive: Sally, who is the wife of C. G. Moore, and lives in Liberty Township; Robert B., who makes his home with his brother, A. L.; Sylvia S., who is the wife of J. A. Green, of Montana; and A. L. The father and mother of the above family were members of the Presbyterian church.

A. L. Worden was reared in Liberty Township and obtained his education here and has always lived on the homestead. He carries on farming and stock raising and is one of the representative agriculturists of this section. On account of his many farm interests he finds little time to devote to politics but he keeps thoroughly posted on all public questions and casts his vote carefully and intelligently. He is identified with the Republican party.

Mr. Worden was married (first) to Miss Sophia Teasworth, a daughter of Isaac and Mary Teasworth, of Liberty Township, and she left one child, Claude L., who married Effie Hickeson, a daughter of Frank and Esther Hickeson. Mr. Worden was married second to Mrs. Daisy (Taylor) Roys, who is a daughter of Ellis C. and Katherine (Harris) Taylor. She has one son, Edwin O. Roys, who resides at Toledo, Ohio. He married Jessie St. Claire.

The Taylors were early settlers in Champaign County, Ohio. The grandparents of Mrs. Worden were Levi and Sally (Chamberlain) Taylor, the former of whom was born in Virginia and the latter in New York. They had nine children. Ellis C. Taylor, father of Mrs. Worden, was born in Champaign County, Ohio, December 9, 1832, and died at New Carlisle, Indiana, September 4, 1903. He attended school at Findlay and was married at the age of twenty-four years to Miss Katherine Harris, a daughter of Dr. and Charlotte (Cumpton) Harris. Six children were born to this marriage: Charles L., who is now deceased; Emma C.; Annabel; Edward W.; Daisy, who is the wife of A. L. Worden; and Harris C., of New Carlisle. The mother of the above family died at New Carlisle, Indiana, October 20, 1894. She was active in the Disciple church.

After marriage, Mr. and Mrs. Taylor continued to reside for a time in Champaign County, where he was a merchant. They then moved to Michigan and from there to New Carlisle, Indiana, where he continued merchandising during the remainder of his life. He became a man of high standing there and was considered a very able business man as well, being active in the Masonic lodge and also in the Disciples church. He was a Republican in politics and was city treasurer for thirty-four years.

JACOB LINE, attorney at law and in the enjoyment of an excellent practice, at Mt. Blanchard, Ohio, was born in Eagle Township, Hancock County, Ohio, February 27, 1870, and is the fifth of a family of ten children. His parents, Peter and Mary B. (Jewett) Line, both of whom are deceased, were pioneers of Eagle Township where his father was a well known school teacher, farmer and tile manufacturer.

Jacob Line spent his early life at home working for his father on the farm and in the tile factory, attending the rural school during the winter months. In 1890 he became a student in Findlay College and for several years he taught school, attended college and read law. In 1895 he entered the law department of the Ohio Northern University at Ada, Ohio, where he completed the course of law and took his Bachelor of Law Degree. October 15, 1896, he was admitted to the bar before the Supreme Court of Ohio. He now practices before the State and Federal Courts.

August 26, 1902, Mr. Line was married to Miss Clare Hammond, daughter of M. G. and Ruth G. Hammond, of Mt. Blanchard, and they have one daughter, Mary Ruth. In politics Mr. Line is a Democrat. He has held the office of city solicitor for eight years and served the village in other offices.

He is interested in fraternal organizations, being identified as Past Grand in Comet Lodge No. 344, I. O. O. F., Past Chancellor of Mt. Blanchard Lodge No. 481, Knights of Pythias, and Past Master of Mt. Blanchard Lodge No. 519, Free and Accepted Masons. He, also, is a member of the ladies' auxiliary lodges. He is considered one of the town's representative citizens. He was one of the promoters and is interested in the Citizens' Bank of Mt. Blanchard.

CHARLES DAVIS*, senior member of the well known grocery firm of Charles Davis & Company, who are located at No. 212 South Main Street, Findlay, Ohio, was born October 31, 1864, at Findlay, Ohio, and is a son of William L. and Mary (Thompson) Davis.

William L. Davis was born on a farm in Marion Township, Hancock County, Ohio, a son of Squire William Davis, who was a native of Cumberland, Maryland, and one of the pioneers of Hancock County. His father entered land from the government, blazed the trail from Findlay to Tiffin, Ohio, and subsequently bought more land, owning at the time of his death 520 acres. William L. Davis was reared on the farm, and when a young man went to Celina, Mercer County, Ohio, where he engaged in buying and selling furs with his uncle Abner Davis. In 1859 he married Miss Mary Thompson of Celina and two years later returned to Findlay, where in October of 1861 he established the grocery store now operated by our subject. The firm was known as William Davis & Company, he having taken in as partners, his brothers John W. and David T. and Martin L. Detwiler, and he continued in that business until the time of his death in 1877. In 1870 he erected a store room and in

1876 he enlarged the block, building around and above the store room, building what was known as the Davis Opera House, which was the first opera house or theatre in Findlay, although there had been several halls where small entertainments could be given. The first attraction to appear at the Davis Opera House was the well known play, East Lynne. The mother of our subject died in 1875.

Charles Davis was reared to manhood in Findlay and in 1884 went to Fostoria, where his guardian, Charles W. Davis, had entered the wholesale grocery business with Charles Foster, who was Governor of Ohio. After finishing in the grammar schools of Fostoria he attended a military Academy in the east, then attended Cornell University until some time during his senior year, when he returned to become a member of the wholesale grocery firm at Fostoria. This firm subsequently failed and Mr. Davis went to Toledo, Ohio, where he entered the commission and brokerage business, and since May, 1906, he has been engaged in his present business at Findlay.

Mr. Davis was married to Emma V. Blecker of Findlay and they have one child, William Henry Davis. The family reside at No. 868 South Main Street. Mr. Davis is well known in military circles of Northwestern Ohio, having served for ten years as Captain of Co. A, Second Ohio National Guards. He is also a member of the B. P. O. E. and Ben Hur orders.

ELISHA TODD, now living retired at McComb, O., is one of the best known and most highly esteemed citizens of Pleasant Township, where about seventy-seven years of his long and useful life have been passed. He was born in Franklin County, O., eight miles east of Columbus, November 15, 1824. His parents were Benjamin and Catherine (Kalb) Todd.

Benjamin Todd was born at Baltimore County, Md., in 1792, and died in McComb, Hancock County, O., March 1, 1882. Between 1800 and 1810 he accompanied his parents, John and Mary Todd, to Ohio, they being pioneers in Franklin County. John Todd was a wagonmaker, and it is recorded that he followed his trade until the close of his life, evidently being a man of skill to have successfully constructed vehicles that could be satisfactorily used in the rough forest roads that then were the only transportation lines in the wild region. He was twice married, his first wife bearing the name of Mary Jarmin, and his second being Catherine Huff. To his first union were born: Benjamin, Joseph, Jesse, John, William, Thomas W., Mary, Elizabeth, Susan and an infant. To the second marriage three children were born: Sarah Ann, Samuel Wesley and Hannah.

In Franklin County, O., Benjamin Todd was married in 1814, to Catherine Kalb, who was born in Maryland August 3, 1795, and died in McComb, Hancock County, O., April 8, 1854. Her parents were George and Mary Kalb, who came early to Franklin County and acquired land there. They had children named as follows: Catherine, John, George, Jeremiah, Isaac, Elizabeth, Annie and Susan. Benjamin Todd followed farming in Franklin County until 1833. In the meanwhile a family was growing up about him and being desirous of properly providing for them, he decided to do as his parents had done before him—push into a yet unsettled region, favorable reports of Hancock County having reached him. In this resolve he was associated with two other old Franklin county residents, and from the same motives, and in August, 1833, Benjamin Todd, John Needles and Edward Stephenson came to Pleasant Township, they being its first settlers. All entered land, Mr. Todd securing eighty acres, his property being on the site of the present flourishing town of McComb. The whole country at that time was heavily timbered and the three sturdy home seekers had no difficulty in securing logs with which to erect cabins on their selected farms. With this provision made for the comfort of their families in the approaching winter, they returned to Franklin County and prepared to make the journey to the new home. This was so momentous an event that it impressed itself on the mind of the nine-year old son, Elisha, so clearly that he can recall all its details after the passage of seventy-seven years. The family started from Franklin County on November 12, 1833, their belongings carefully packed for the long journey—probably in a wagon made by the grandfather—and five days later reached the pioneer home in Pleasant Township. Mr. Todd also recalls that he was suffering at that time from a not unusual malady, the every-other-day ague, a distressing complaint that more or less prevailed among all pioneer settlers and which no doubt was the result of miasmatic conditions. Mr. Todd remembers the remarkable display of meteors which took place on the night of November 13, 1833, the nature of which was not then as scientifically explained as at the present day. As quickly as possible enough land was cleared before the ground froze, to get in a small crop but it took many years before the timber was all cleared off and the farm made profitable for tillage.

To Benjamin and Catherine Todd the following children were born: Mary, John, George, Margaret, Elisha, Benjamin Asbury, Susan Jane, William H., Delilah and Sarah Catherine. Mary married Philip Shumaker, who is deceased. She was born in Franklin County, as were seven others. John Todd married Christiana Shumaker and they lived near McComb until 1854, when he started for Iowa, but was prostrated with typhoid fever on the way and died at Joliet, Ill., his family continuing to Iowa in the following spring. George Todd married Rachel Needles and spent all but the last ten years of his life at McComb, dying in Iowa. Margaret married Alexander Harkness and they lived in Ohio until 1854, when they moved to Iowa, where both died. Benjamin A. Todd for the past thirty-seven years has been a resident of Lawrence, Kans. He is a retired minister, teacher and farmer. He married Sarah Edgar. William H. Todd spent his life in Pleasant Township and died at McComb. He married Eliza Gault. Delilah Ann married John W. Todd and soon after marriage they moved to Iowa and died there. Sarah Catherine married Joseph Bixby and they moved to Nebraska and died there.

Elisha Todd had but meager educational opportunities after coming to Hancock County and he was fourteen years old before the township had a district school. He worked on the farm and took part in the social festivities that testified to neighborhood good will, married and became a quiet, industrious, law abiding citizen. Conditions changed as the country became settled and by 1847 the first lots for the building of McComb were laid out on his father's farm. As the site of a town, this land became exceedingly valuable; much of the farm was subsequently absorbed and where once stood giants of the forest, as Mr. Todd recalls, there are now streets busy with traffic or structures devoted to the housing of hundreds of people and to their schools and churches. He has watched all these changes with the keenest interest and for some years after his return from the army, he assisted practically in this development, following carpentering and building.

Mr. Todd was thirty-seven years of age when the Civil War broke out, and in August, 1862, at Findlay, he enlisted as a soldier in the Union army, becoming a member of Co. D, 99th O. Vol. Inf., under Capt. A. J. Pope. The first battle in which he took part was that of Stone River and the last one was the battle of Nashville. His division went as far as Atlanta and returned from there with Gen. Thomas and following the battle of Nashville, his regiment was sent to North Carolina. He took part in the battle of Chickamauga and in many others and he remained in the service until the close of the war and was honorably discharged at Camp Dennison, O., July 17, 1865. He was twice wounded but not seriously. He is a member of John Howard Post, No. 154, at McComb, O.

In 1847 Mr. Todd was married to Miss Edith Harkness, who died without issue in 1851. In 1853 he was married to Miss Mary Gault, a daughter of Moses and Rachel Gault, and to this marriage the following children were born, Martha, Sylvester B., Sanford, Rachel Catherine, Benjamin M., Ulysses, Terry T., Mary and Rufus S. Martha married E. C. Kelly and they live three and one-half miles southwest of McComb. They have six children: Earle, A. C., Clyde, May, Eunice and Carl. Sylvester B. Todd is a farmer residing in Sandusky County. He married Tilda Broy and they have four children, Annie, Mina, Ira Glenn and Estella. Sanford Todd died after reaching manhood. Rachel Catherine is now deceased. She was the wife of Doc Montgomery of Portage Township. Benjamin M. Todd has spent the larger part of his life at McComb, where he follows the plastering trade. Ulysses is a carpenter by trade and resides at Toledo. He married Della McCreary. Terry T. Todd is a carpenter and architect and has resided as Los Angeles, Cal., since February, 1905. He is married and they have one daughter, Margaret Pauline. Mary is the wife of Raleigh Lano, a brick mason and contractor, and they live at Port Clinton, O., and have two children, Terry and Herbin. Rufus S. Todd is a carpenter and in business at Findlay, O. He married Lucinda Gibson. The mother of the above family died in 1902.

Mr. Todd no longer takes any active part in town matters but formerly was a leading public citizen. In politics he is a Democrat. He has been mayor of McComb, a member of the town council, a justice of the peace, township supervisor and served five years as assessor in Pleasant Township. Among his early recollections are the following, which will be of interest to many readers:

"The first schoolhouse in Pleasant Township was built in 1838; the first teacher, Samuel Bowman. Only three months' winter terms were taught during my school age. The first mill for manufacturing flour or meal was a horse-mill. The first religious society in the township was organized in 1834 in my father's cabin house by the M. E. church. The first church house in McComb was built in 1850 by the M. E. church. At the first election when the township of Pleasant was organized there were only twelve voters."

JOSHUA NEISWANDER, member of the Van Buren Township School Board and a well known farmer and carpenter, owns seventy acres of well tilled land situated in Section 29, Van Buren Township, Hancock County, O. He was born January 4, 1857, in Richland Township, Allen County, O., and is a son of Michael and Fannie (Geiger) Neiswander.

Michael Neiswander was born in 1822, on the Atlantic Ocean, during the voyage of his parents from Germany to America. His parents settled in Wayne County, O., where they lived until 1832, when they removed to Richland Township, Allen County and there Michael Neiswander grew to manhood and married Fannie Geiger. He acquired 240 acres of land and devoted his lifelong efforts to its cultivation and improvement. This farm is still in the family. Michael Neiswander was a Democrat in politics but for the last fifteen years of his life, took little interest in outside affairs. Both he and wife were members of the Mennonite church. His death occurred when he was over seventy years of age and that of his wife when she was seventy-six, and both were interred on the home farm west of Bluffton, O. They were good people who were long held in respectful memory by those who knew them.

Joshua Neiswander attended a German school in Richland Township until he was about fifteen years of age, when he learned English. After his school days were over he helped his father and gradually became a well balanced and intelligent farmer himself and after his marriage he came to his present farm, which he bought from John Freed, clearing twenty-five acres of it, draining a large part of it and still having six acres in wood land. Being a carpenter as well as a farmer, he began to put up first class buildings on his place and all those now standing he erected.

In the fall of 1880, Mr. Neiswander was married to Miss Susan Blosser, whose father died of smallpox when she was small. Mr. and Mrs. Neiswander have nine children, namely: Harry A., who is a medical student at Cleveland, married Rosella Spacht, of Van Buren Township; Lois, who is the wife of J. M. Bushong, of Van Buren Township; Leo, who attends the Ohio Normal School at Ada, O.; Estella, who is a popular public school teacher at Jenera, O.; Claude, who is in his third term in the Ada High School; and Edgar, Byron, Ralph, and Una, all at home. In politics, Mr. Neiswander has always been a Democrat. He has frequently been elected to township offices and for two terms was township trustee and is now serving in his second year as president of the township school board. He is a representative citizen of Van Buren Township.

HON. JAMES B. WALKER,* who served two terms as mayor of the city of Findlay, O., is a leading citizen of Hancock County, and is also an honored veteran of the great Civil War. Mr. Walker was born in Pennsylvania, November 3, 1840, and is a son of James B. and Maria (Adams) Walker, the former of whom was a native of Vermont, but died in Pennsylvania.

James B. Walker obtained his education in his native state and probably would have become a millwright, as was his father, had not the Civil War been precipitated about the time he should have chosen a trade or profession, and perhaps that was all the more fortunate for the people of Findlay, as it was the pursuit of the business he subsequently engaged in, that brought him to Ohio. In April, 1861, in answer to the first call, Mr. Walker enlisted in Company D, 1st Pa. Vol. Inf., the famous "Bucktails," and continued in the service for three years, after being three times wounded being transferred to the Veteran Reserve Corps, May 21, 1864. He is a valued member of the G. A. R. Post at Findlay, where often his old comrades recall with him the sharp engagement at New Market Cross Roads, where his first wound was received; the second battle of Bull Run, when he was again unfortunate, and at South Mountain, where his third wound was received and many of his regiment fell by his side.

Mr. Walker returned to his home in Pennsylvania and soon afterward became interested in the oil business and continued this interest after coming to Hancock County in 1888. He has taken an active part in politics in city and county and his leadership was recognized first when he was elected on the Democratic ticket, in 1906, to Findlay's highest municipal office, and his administration was approved as was evinced by his re-election by a majority of 600 votes. Mr. Walker has a pleasant home and handsome residence at No. 217 East Main Cross Street, Findlay. He married Miss Elizabeth McGill, a daughter of James McGill, and they have three sons. Mr. Walker is a Mason.

HENRY BENTON THOMAS, who enjoys the distinction of being the oldest born native white child in Pleasant Township, Hancock County, O., a member of one of the oldest township families and an honored survivor of the great Civil War, has lived a busy and useful life and is a man of very interesting personality. He was born on the old Thomas farm on which he lives, September 1, 1837, and is a son of Jacob and Rebecca (Edginton) Thomas.

The paternal grandparents of Mr. Thomas were Charles and Mary (Ripley) Thomas. Charles Thomas was born in Virginia and his father was a native of Pennsylvania. Grandfather Thomas and wife settled in Marion Township, Hancok County, when they came to Ohio from Virginia, they died there, and their burial was on the old farm. They had seven children and of these the father of Henry B. Thomas was the eldest. A number of the others have descendants in this section. Nancy married Robert Hamilton and both died at Findlay. Eliza was the wife of David Henline. John married Nancy Ankrom and he and wife lived and died near the Thomas Church. Daniel married Lucy Ann George and they lived east of Findlay, where he died. George first married Catherine Paden, then Mary Paden and they lived and died on their farm three miles east of Findlay. William married Sidna Paden, a sister of Catherine and Mary Paden, and lived the greater part of his life on the home farm which he later sold and moved to Findlay, where he died. Narcissa married a Mr. Bennett and they lived and died at Bryan, in Williams County.

Jacob Thomas, father of Henry Benton, was born in 1810, in Tyler County, Va., and died in Pleasant Township, April 2nd, 1878. He accompanied his parents to Ohio in 1832 and with them settled in Section 16, Marion Township, Hancock County, and remained two years longer with his father. In 1837 he came to the farm now owned by his son, Henry B., which has never since been out of the Thomas family. At the time of his death he owned 240 acres. Pioneer conditions prevailed when Jacob Thomas came to Pleasant Township. The land was heavily timbered and not a stick had ever been cut. There was not much chance for sociability as the other nearest settler was several miles away. The first log cabin had dimensions of 12 x 14 feet but a second house was built in the same fall, 16 x 18 feet, of hewed logs and with a clap-board roof.

Jacob Thomas was twice married. His first wife was Rebecca Edginton, and his second was Elizabeth Gorrell. Four children were born to the first union: Mary Jane, May 28, 1835; Henry Benton, September 1, 1837; Levi Marion, October 13, 1839; and Julia Ann, July 27, 1843. Mary Jane married Peter Deter (died January 11, 1900) whom she survives and lives in Portage Township. Levi Marion married Mary C. Wilson. He lived near North Baltimore, where he followed farming. He was a soldier in the Civil War, a member of Co. G, 21st O. Vol. Inf., and was captured with his comrades, at Chickamauga. He died May 11, 1906. Julia Ann married John W. Butler, formerly of Pleasant Township, but a resident of Findlay before his death. She resides on Center Street in that city. The children born to the second marriage of Jacob Thomas were: William C., February 12, 1848; Caroline, September 4, 1846; David H., January 6, 1852; Cyrene, January 13, 1850; and Amanda April 30, 1859 (died July 22, 1899). William C. Thomas holds the positon of captain in the Soldiers' Home at Dayton, O. He served in the Civil War in the 178th O. Vol. Inf. He has been twice married, first to Barbara E. Nye and second to Belle Lathonce, of Columbus, O. Caroline married Hon. Eb. Poe, late of Columbus, and formerly state auditor of Ohio. David H. Thomas formerly resided in Pleasant Township but is now engaged in mining in the West. He married Columbia J. Bowman. Cyrene married J. F. Dillinger and they own a farm near Hoytsville, O., but reside in Dayton. Amanda, who is now deceased, was the wife of Corwin Wilson, who survives her and lives near North Baltimore, O.

Henry Benton Thomas grew up on the home farm and obtained a district school education. He worked on his father's and his uncle's farms, the latter living then east of Findlay. He was a member of an independent military company which had been organized in 1861, at McComb. They went to Findlay and there he formally enlisted for service in the Civil War, on September 19, 1861. His regiment was sent first to Camp Dennison, at Columbus, and from there to Piketown, Ky., and from there to Louisville and he was on guard duty at Lexington, Murfreesboro, Tenn., and other points and then went to Nashville, Tenn. Later he was a participant in the battle of Stone River and was at Lookout Mountain and Chattanooga, Graysville, Kenesaw Mountain and Atlanta. He celebrated his birthday in September, 1863, by fighting in the battle at Jonesboro, Ga. He belonged also to the victorious army that marched with Sherman to the sea. Other engagements in which he bore a brave soldier's part were Raleigh, Goldsboro and Martha's Vineyard, on New River, N. C., and then came Richmond and later the grand review at Washington, D. C., and he was finally mustered out at Columbus, O. Mr. Thomas saw very hard service and the word soldier recalls to him the sternest kind of discipline and scenes of carnage and suffering that he hopes his country will never again witness.

Mr. Thomas returned to Hancock County practically unharmed after his military service was over. His father had given him eighty acres of land in Pleasant Township and to this he added eighty more. In 1878 he sold this land and moved to Saline County, Kas., where he spent one year in agricultural efforts, but his success was not up to his expectations and his crops were entirely destroyed by the hot winds. In the meanwhile his father had died and so he returned to Pleasant Township and here he has continued to live ever since. The house in which Mr. Thomas and family had lived since their return to the old homestead, was destroyed by fire and the present handsome residence was erected in 1901. Mr. Thomas has 116 acres under cultivation, this farm being one of the best in the township.

October 4, 1866, Mr. Thomas was married to Miss Ruthanna Archer, a daughter of Henry and Lucinda (Osenbaugh) Archer, of Mercer County, O. Six children were born to them, namely:

Mary Orlida, born July 9, 1867; married Willis Mygrants, April 9, 1898; they live in Jackson, Mich. They have three children—Warren, born March 11, 1899; Russell, born September 12, 1900; Cliffton, born October 30, 1905.

Minnie L., born October 4, 1868; married Chester Ewing of McComb, December 6, 1899. They have three children—Lois, born May 30, 1901; Webster, born March 5, 1903; and Arthur, born April 21, 1906.

Delos Archer was born December 13, 1869; was married to Belle Norris of Cass Township (where they have since resided), September 5, 1894. They have three children—Gayle, born September 4, 1895; Bernard, born January 25, 1900, and Raymond, born September 8, 1903.

Estella J., was born October 31, 1871; was married to Fred King, January 23, 1896, and they have two children—Ralph, born February 10, 1897, and Iloe, born September 21, 1900.

Sarah Elizabeth and Laura Leota, who reside with their parents.

Mr. Thomas and family were members of the Thomas Methodist Episcopal church, in which he formerly was an official. For the past twenty-five years he has maintained opinions that identify him with the Prohibiton party, but formerly he was a Democrat. He served a number of times as township trustee and was active generally in public affairs. He is a member of John Howard Post, No. 154, G. A. R. at McComb.

WILLIAM H. ADELSPERGER, who is engaged in general farming and stock raising on Elm Wood farm, is the owner of 390 acres of fine farming land, located in Sections 10 and 13, Big Lick Township, Hancock County, Ohio, and is one of the representative agriculturists of the county. He was born June 22, 1842, in Tiffin, Seneca County, Ohio, and is a son of John and Cinderella (Ricketts) Adelsperger, and a grandson of Jacob Adelsperger, who was a native of Hagerstown, Md.

John Adelsperger, father of our subject, was born in Hagerstown, Md., and during his boyhood came to Tiffin, Seneca County, O. He was first married to Cinderella Ricketts, and to them were born three children: William H.; John F., deceased; and Joseph A., deceased. His second union was with Mary Albert, and resulted in the following issue: Mary Jane; Katherine; Amanda; Flora; Nora; Charles; James; Albert; Frank; John, deceased; and Henry.

William H. Adelsperger was reared in Tiffin, Ohio, and there obtained his education in the public schools. In 1861 he enlisted for three years in the 49th Ohio Vol. Inf., and was with the Army of the Cumberland in Tennessee, Alabama and Georgia. He later enlisted with the 64th Ohio Vol. Inf., for one year, and participated in many of the important battles of the war, his last two fights being the battles at Franklin and Nashville. He was not sick a day during his entire four years' service. He was taken prisoner at Stone River, and honorably discharged at St. Louis in 1865. After the close of the war he worked at carpentering for six years and in 1871 bought his present farm in Section 10, Big Lick Township, Hancock County, Ohio. He has just completed building a large brick residence on Elm Wood farm, and has one of the finest and best improved farms in the township.

In 1871 Mr. Adelsperger was married to Sophia Kenner, who was born December 25, 1850, in Germany, and at the age of two years came to this country with her parents. Of their union have been born the following children: John, who died aged six years; Minda, who died aged eighteen years; Milton L., who operates Elm Wood Farm, is married and has one child, Clarence; and Joseph A., who farms his father's place in Section 10, Big Lick Township. Mr. Adelsperger is a member of the G. A. R., Morris Post of Fostoria, is politically a Republican, and is now serving as land appraiser, having been elected to that office one year ago.

JOSEPH S. PATTERSON, who for sixty years has been identified with the mercantile interests of Findlay, O., is the senior member of the firm of J. S. Patterson & Sons, a business which had its inception in 1849, stands today as one of the representatives of the highest standard of business integrity. The activities in which he has been engaged for so long a time and with so much ability, have had an effective part in the commercial and financial upbuilding of this city. Joseph S. Patterson was born November 25, 1827, at Bellefontaine, Logan County, Ohio, and is a son of Robert and Eliza (Moore) Patterson, and a grandson of Rev. James Patterson, who was a clergyman of Ballee, County Down, Ireland.

Although the Pattersons originated in Ireland, for a generation they have been American and in almost every State of the Union, bearers of this honorable name have been distinguished in some walk of life.

Robert Patterson, father of Joseph S., was born in 1789, in Ireland. In 1811 he came to Licking County, O., one of the venturesome pioneers, but he later established his permanent home at Bellefontaine, in Logan County, where he was engaged in mercantile pursuits until his death in 1867. In 1819 he was married to Eliza Moore, a daughter of Joseph Moore, also a pioneer, and they had nine children born to them, the fifth in order of birth being given the name of Joseph S., and he is one of the two survivors.

Joseph S. Patterson attended school at Bellefontaine until he was sixteen years of age, leaving home at that time with the intention of providing for his own necessities and of preparing himself to do so in the future by learning a special line, heredity, perhaps, having something to do with his choice. He came to Findlay in 1843, where he found employment as a clerk with Frederick Henderson, with whom he continued for six years, when he purchased an interest in the business and it was continued under the firm name of Henderson and Patterson. Three years later the business was reorganized and additional capital gave the concern larger and more extended facilities, and the firm name then became J. S. Patterson and Company, remaining that way until 1857.

In the above year, Mr. Patterson retired and purchased the business of Van Eman and Company. Two years later, Milton Taylor, a brother-in-law, became associated with him under the firm name of Patterson and Taylor. This firm continued until the withdrawal of Mr. Taylor in 1865.

In 1866 Mr. Patterson built his present business block, moving into it early in 1867. From 1870 to 1875 the firm name was Patterson and Winders.

In 1878, Chas. W. Patterson, his eldest son, became interested under the firm name of J. S. Patterson and Son.

Five years later, Frank T. Patterson, the second son, was taken into the firm, when the name became J. S. Patterson & Sons and has so continued to the present time.

With the exception of one year during which he was local agent for the Mad River and Lake Erie R. R., for sixty years and over, Mr. Patterson has been interested in the same line of business and has always been recognized as a keen and able business man.

In 1853 Mr. Patterson was married to Minerva Taylor, a daughter of Wm. and Margaret Taylor, one of the early pioneer families. For years, they enjoyed one of Findlay's handsomest homes at No. 823 South Main Street. Two sons were born to them, Charles W. and Frank T. Patterson.

In religious matters, Mr. Patterson has always taken an active interest. His affiliation has been with the Presbyterian denomination, of which church he is an elder as well as a liberal supporter.

As a charter member of the City Y. M. C. A., he was always interested in its work and contributed liberally towards its present building and equipment.

Politically, Mr. Patterson has always been a Republican. He never aspired to office and never held but one office, that of city councilman and that as a matter of duty.

JASPER DUKES,* one of Blanchard Township's most substantial citizens, a large dealer in livestock and the owner of 700 acres of valuable land, was born in Union Township, Hancock County, O., in January, 1850. His parents were D. R. and Eliza Jane (McDowell) Dukes.

D. R. Dukes was born in Franklin County, O., and when he came to Hancock County and entered 160 acres of land from the Government, he had not more than reached his majority. He continued to live on this land for more than twenty years, but in 1864 he moved to a farm on the Ridge road and was residing there at the time of his death, which occurred when he was aged seventy-six years. Of his 160 acres he had cleared 100 of it and was considered a sensible and judicious farmer. His first wife was named Miller and four children were born to that union. His second marriage was to Eliza Jane McDowell, who was born in Licking County, O., of Irish parentage. Nine children were born to this marriage, as follows: Laura, who is the widow of Mr. Comley; Jasper and Irwin, twins, the latter of whom died at the age of fifteen years; Naretta, who is the wife of J. S. Renhart, of Findlay; Elizabeth, Caroline and Richard, all of whom died when about five years of age; and two that died in infancy. D. R. Dukes and wife were members of the Methodist Episcopal church.

Jasper Dukes attended the public schools in Union Township and then became his father's main helper on the farm, and after his marriage, in 1875, started for himself on 160 acres of his present farm. To the original acres he added, purchasing two tracts of eighty acres each, one of fifty and two others each containing 165 acres, until he now owns 700 acres of land, all in one body. Since 1872 he has done a large amount of business handling livestock, his purchases and shipments annually reaching into thousands of dollars. Mr. Dukes has not torn down the old house in which he first went to housekeeping, but in recent years he has erected one of the handsomest rural homes in Blanchard Township and has put up other substantial buildings, having five sets of farm structures on his land. He has otherwise improved his property, taking a great deal of interest in it and is the practical overseer of all the farm operations.

In March, 1875, Mr. Dukes was married to Miss Maria M. Hopkins, a daughter of M. E. Hopkins, of Blanchard Township, and they have six children: Nora D., who is the wife of Frank Wineman, resides in Blanchard Township, Putnam County, O.; Floyd J. and Claud A., twins, the former of whom married Carrie McClelland, a daughter of B. F. McClelland, of Eagle Township, and the latter of whom married Bertha Thomas, a daughter of J. W. Thomas, of Putnam County; D. R., who married a daughter of William Miller, of Putnam County, and they have two children; and Eli V. and L. P., the latter of whom is a student at Findlay College. As was his father, Mr. Dukes is a Republican. He served three years as township trustee and two years as assessor. He is identified with the order of Elks, at Findlay.

HON. WILLIS E. COOPER, formerly mayor of McComb, O., and a leading member of the Hancock County bar, was born just east of this town, in Pleasant Township, Hancock County, O., November 16, 1868, and is a son of Allen and Rebecca A. (Ritter) Cooper.

Allen Cooper was born in Portage Township, Hancock County, O., in 1834, the first white male child born in the township. His father was John Cooper, who came from Perry County, O., and entered eighty acres of land in Portage Township, Hancock County, in 1832 and lived here until his death when over eighty years of age. He became a man of large estate and at the time of his death, in 1891, he owned 700 acres of valuable land. He was also more or less prominent in public affairs and served as associate justice of Hancock County. He married Eliza Jane Cusac. In 1860, Allen Cooper entered into the saw mill and planing mill business and continued until 1902, when he retired to Findlay, where he and wife live at present, people well known and highly esteemed. He married Rebecca A. Ritter, who was born in Ohio and was small when her parents came to Hancock County. Her father was born in Germany and came to McComb from Stark County, O. He later bought a farm in Hancock County and alternated farming and working at his trade, which was that of a tailor. The children born to Mr. and Mrs. Ritter were: Rebecca, who married Allen Cooper; William C., who lives east of McComb; Thomas J., Gideon and Caroline, all three of whom are deceased. The brothers and sisters of Allen Cooper were: James, who lives at Knoxville, Tenn.; John, who resides north of Findlay; William P., who was accidentally killed while working in the lumber business; Martha, deceased, who was the wife of John D. Ewing; Sarah, deceased, who was the wife of James Shoemaker; Phebe E., who is the wife of Moses McAnelly, of Big Lick Township, Hancock County, and one that died young. To Allen Cooper and wife eight children were born, as follows: Ida L., who is the wife of H. W. Doty, an attorney of Chattanooga; Willis E.; Joy and Arba, both of whom died in childhood; and four who died in infancy.

Willis E. Cooper was educated at McComb and in 1886, after leaving the McComb High School, he began making his preparations for the study of law and on January 1, 1890, he became a law student under H. Walter Doty, and remained in the office of this well known attorney until January 10, 1893, when he entered the law department of the Ohio State University and creditably passed the required examination for the bar on June 8, 1893. He entered into practice at Findlay and remained there until November 1, 1895, when he came to McComb, at that time purchasing the law and insurance business of ex-Mayor A. D. Whisler. He soon received professional recognition and ere long had become a prominent factor in local politics and in 1897 he was nominated and subsequently elected on the Democratic ticket, mayor of McComb. His administration of the office proved eminently acceptable and he was re-elected in 1899, 1901, 1903 and again in 1905, serving for five successive terms, aggregating ten years and nine months, in the highest municipal office in the gift of his fellow citizens. His personal popularity is unusual and at his first election he overcame the normal Republican majority of forty votes. Since June, 1907, he has served as city solicitor. His line of practice includes general law and abstract work.

Mr. Cooper was married to Miss Bessie D. Bowen, who was born in West Virginia, a daughter of J. W. and Theresa Bowen, and they have two daughters: Dorothy F., a school girl of eleven years; and Catherine Cliff, who has seen but four summers. Mr. Cooper is identified fraternally with McComb Lodge, No. 179, Knights of Pythias; Camp No. 7474, Modern Woodmen of America; and the Tribe of Ben Hur.

CHARLES ERSKINE NILES (deceased), the late president of the First National Bank of Findlay, O., and one of the best known and most respected citizens of Hancock County, was born in Boston, Mass., in 1836. His early years were passed with his parents, in St. Catharines, Ontario, where he received a good education at the grammar school and academy, located in that little city, and later, upon the removal of his family to Hudson, Mich., he completed with great credit a full commercial course in one of the leading mercantile colleges of the country.

Mr. Niles' first business experience was in Cleveland, from which place he went to Ashtabula, O., where he was connected with the old Farmers' Bank, and later he went to Hudson, Mich., where he took a responsible position in the banking house of Boies, Rude & Company, also for a time being interested in the mercantile business.

In the early sixties, Mr. Niles came to Findlay, and with the late E. P. Jones, organized the First National Bank, in the spring of 1863, and he was its cashier for thirty-one years, or up to the time of the death of its president, E.

P. Jones, in 1894, after which time he was president of the institution. In 1895-1896 he was president of the Ohio Bankers' Association. Mr. Niles was one of the best known bankers in the State. "He was an indefatigable worker and was a shrewd observer of men and events. He was at his desk every business day with the regularity of a clock, always immersed in his duties, but never too busy to attend to the wants of a customer, no matter how humble or how inconsiderable his desires. His management of affairs was almost perfection, and his judgment almost infallible. During his long connection with the bank its influence became great, and it was rated among the best conducted and soundest in the land. Confidence in its integrity and standing was never shaken through all the financial storms that swept over the country."

His close application to his duties affected his health, which began to fail a year or more previous to his death. He finally decided to go to Florida for needed rest and recreation, in hopes that he might regain his old-time vigor and strength, and in February, 1908, this resolution was put into effect. Accompanied by his daughter-in-law, he journeyed to Sarasota, said to be an ideal spot, noted for its pure atmosphere, charged with health giving qualities. Mr. Niles and his daughter had been there but a short time when a stroke of paralysis resulted in his utter prostration. He subsequently rallied from this shock, however, and hopes were entertained for his final recovery. When he had become strong enough, it was decided to risk the journey home to Findlay. The start was made, with his wife, daughter and a nurse, but he had scarcely journeyed two hundred miles, just before reaching Jacksonville, when he was stricken with another attack, and died on the train while en route, on Saturday evening, March 28, 1908.

Mr. Niles was seventy-two years old, and had resided in Findlay the greater part of his long, busy and useful life. His widow, and one son, C. F. M. Niles, president of the Security Savings Bank & Trust Company of Toledo, were left to mourn their irreparable loss. Mr. Niles was pre-eminently a domestic man, being rarely seen away from his own fireside, when not attending to his daily business duties. He was a Presbyterian in religious faith, a staunch supporter of the First Presbyterian church of Findlay, and a generous contributor to every local charitable institution.

Mr. Niles was a Son of the American Revolution, a Free Mason of high degree, belonging to the various Masonic bodies and a Noble of the Mystic Shrine, and was also a very prominent Odd Fellow, being one of the oldest members of the Grand Lodge of Ohio, and was grand treasurer thereof for eleven years prior to his death. He was one of the early members of Hancock Lodge, No. 73, of Findlay, in which he filled every office, and was also a member of Golden Rule Encampment, Findlay Rebekah Lodge, and was colonel of the Patriarchs Militant. Many prominent Odd Fellows and bankers, as well as other leading citizens from all parts of Ohio, were present at the funeral services to pay their last tribute to their beloved friend and comrade. In his case further eulogy is superfluous. The strength and fullness of his well rounded character, and his genial and attractive personality are well known to all prominent citizens of Findlay and throughout Hancock County. In him the county lost one of the most valued of its adopted sons.

MOSES McANELLY, who owns 341 acres of valuable land in Hancock County, O., one farm of 160 acres and one of eighty-one acres, situated a half mile north of the New Haven road, eight miles east of Findlay, is a very successful farmer and stock raiser of Big Lick Township. He was born March 15, 1853, on this farm, and his parents were Hon. Moses and Mary (Roller) McAnelly. Hon. Moses McAnelly was a prominent man in Hancock County for many years, serving two terms in the lower house of the state legislature, and two terms in the senate. He was born in Pennsylvania, in Westmoreland County, in 1804, and came to Hancock County in 1830, where he engaged in teaching school. He was a man of intellectual attainments, fine address and naturally became a leader. In 1833 he married Mary Roller, who was born in Pennsylvania in September, 1812, a daughter of Judge William and Nancy Roller. When she was twelve years old her parents came to Richland County, O., and from Lucas to Hancock County, O., and entered land from the Government which consists of the present farm. To Moses and Mary McAnelly the following children were born: William, who is deceased; Jefferson (was a county judge in the State of Colorado); John, who is deceased; Mary, who married a Mr. McAnelly; Nancy, who married Nathaniel Thomas; Lucinda, who married Charles Beamer; Charlotte, who married Ben Cole; and Moses, who bears his father's name. Judge Jefferson McAnelly married Sarah Leonard. The father of this family died in 1852, aged forty-eight years. The mother survived to be eighty-three years of age, her death occurring on March 5, 1898.

Moses McAnelly enjoyed fewer educational advantages than would have been his had his father lived, but the latter's early death threw heavy responsibilities on the sons, and Moses very soon became the home farmer and has resided here all his life. He does general farming, but is mainly interested in raising stock. During the early days of the oil excitement he was somewhat interested and met with success in the ventures he made in connection with that industry.

In 1881, Mr. McAnelly was married to Miss Phebe Cooper, who was born and reared in Portage Township, Hancock County, and they have five children: John C.; May Ann, who was married in 1908 to Wilson Long, and they have twin daughters—Mary and Martha; Thomas Homer, who was married in 1908 to Jane Tobey; and Roller C. and Lois. Mr. McAnelly and family are members of the Methodist Episcopal church. In politics he is a Democrat, but he has never consented to accept public office. He is identified with the order of Ben Hur, at West Independence.

HENRY DEEDS, the owner of 130 acres of rich farm land, which is situated in Section 1, Union Township, is one of the old settled residents of this neighborhood, having lived on his present homestead for thirty-six years. He was born in this township, October 5, 1846, and is a son of Henry and Margaret Deeds.

Henry Deeds was born in Pennsylvania and when young was brought by his parents to Fairfield County, O., where he grew to manhood. He was subsequently married there to Margaret Kramer, who was born in Fairfield County, and like himself, came from an agricultural family. Later—in 1833—they moved to Hancock County, Ohio, where Henry Deeds carried on farming all his life, his death occurring in Union Township in 1892. His widow survived him for only six years.

Henry Deeds, the present bearer of the name, was reared in Union Township and attended the district schools whenever he had the opportunity, but in his boyhood days school privileges were not afforded as they are in the present time. Following his marriage he lived for five years in Eagle Township and then moved to his present farm, on which, at different times he has made improvements, rebuilding both house and barn and attending to all the other details which, to an experienced eye, distinguishes a well kept farm from one which is neglected. He carries on general farming and raises stock, not indulging in any registered animals, however, finding the common kind, when well cared for, sufficiently profitable. He has money invested in other property and owns a large frame dwelling house which is in the heart of the business district of Findlay.

In 1869, Mr. Deeds was married to Miss Ellen Elsea, of Eagle Township, Hancock County, and they have had five children: Etta May, who is the wife of George Crozier, of Eagle Township, (they have four children—Dorsea, Roy, Nellie, and Gale); Roy, who married Amanda Schwine, of Union Township and after her death, Gertrude Powell, and died at Findlay, in 1905; Maggie, who died on the farm in 1893, aged nineteen years; Cora Dell, who died here in 1899, aged sixteen years; and Myrtle Estella, who is the wife of Eaber Davis, of Eagle Township. Mr. and Mrs. Davis have been called upon to bear heavy domestic affliction. They are members of the United Brethren church at Findlay, in which Mr. Deeds is an elder.

OLIVER HUFFMAN,* a representative citizen and excellent farmer of Union Township, Hancock County, O., resides on the farm of 100 acres on which he was born, May 30, 1860. His parents were C. W. and Barbara (Fleck) Huffman.

C. W. Huffman was born in Fairfield County, O., and came to Union Township, Hancock County, with his parents when only three years of age, his father, Jacob Huffman, being one of the pioneer settlers in this section. The Huffmans have always been farmers and have been people of high standing in the township.

Oliver Huffman has always lived on the home farm which he now owns and since it came into his possession he has made many substantial improvements, the last ten years having witnessed the tiling of the land and the building of his comfortable residence and commodious barn. Mr. Huffman is one of the progressive agriculturists and has his land in such condition that excellent crops are invariably produced and different kinds of stock have their natural increase.

Mr. Huffman was married in 1885, to Miss Katie Smith, a daughter of Christian and Elizabeth Smith, both of whom were born in Germany. Mrs. Huffman was born in Union Township and she and husband attended the same school. They have had two children: Charles, who was born in 1887, died at the age of ten years; and Clarence, who assists his father. Mr. Huffman has always taken a large amount of interest in public education and served on the township school board from 1891 until the fall of 1909.

A. L. OPP, dealer in wool and other farm products, who resides on his farm of 120 acres situated in Sections 34 and 35, Marion Township, is also the owner of a farm in Section 8, comprising 116¼ acres, located near Findlay. In addition to these interests he also cultivates the Beard farm of 120 acres. He was born October 12, 1866, on the old Opp homestead in Marion Township, a son of B. F. and Sara Ann Opp, his parents being old settlers and representative people of Hancock County.

The subject of this sketch, after securing a district school education in his boyhood, began to take up farm work, of which he soon obtained a practical mastery. After his marriage he removed to the home farm of his wife to take charge of it, later purchasing other desirable land, and he has been a prominent representative of the agricultural interests of the county ever since. Besides engaging in general farming, he makes a specialty of raising sheep, keeping a flock of about 200 and dealing extensively in wool, both buying and selling. He also carries on a coal business, owns stock in the Buckeye Clay works at East Liverpool, Ohio., and also owns stock in the Peat Fuel & Gas Company of Michigan. Thus in various ways he shows his enterprise as a business man and his efforts have been rewarded with a gratifying degree of prosperity.

On July 18, 1886, Mr. Opp was married to Miss Esther Beard, a daughter of the late James and Henrietta Beard. They have three children—Onnon, who is a graduate of Findlay College; Grace, who is a teacher of public school; and Rozella, who is a Boxwell graduate. Mr. Opp and his family are members of the United Brethren church, which he has served as a trustee for many years. In politics he is a Democrat and has held the office of township trustee. In addition to other modern improvements on his place, Mr. Opp has installed the telephone, which he finds necessary to the prompt transaction of his large volume of business.

CHARLES DETER, a general farmer and representative citizen of Portage Township, is a member of one of the old and substantial families of this section. He was born on the Deter homestead, situated in Section 8, Portage Township, this county, April 25, 1874, and is a son of Peter and Mary Jane (Thomas) Deter.

The father of Mr. Deter was born in Pennsylvania, a son of Jacob Deter. The latter moved to Richland County and in 1836 brought his family to Portage Township, Hancock County, and bought the present farm from Jasper Franks, who made the entry. Jacob Deter and wife died on this farm. Here the father of Charles Deter was reared from the age of eleven years and spent his life, his death occurring on January 11, 1900. He was widely known and a highly respected man. He married Mary Jane Thomas, who was born east of Findlay, in Hancock County, a daughter of Jacob Thomas, who moved to Pleasant Township when she was eleven months old, and she was reared there. Mr. and Mrs. Deter had five children, namely: Alice, Ida, Laura, Clifford and Charles. Laura is the wife of W. A. Wiseley, of Vanlue, O. The Deter family own collectively 280 acres of some of the finest farm land in Portage Township, their possessions individually being as follows: The mother owns the homestead of 160 acres; Charles owns forty acres, in Section 8; Clifford owns forty acres; and Ida and Alice together own forty acres. The whole farm is managed and operated by Charles and Clifford Deter. They carry on general farming and are numbered with the successful agriculturists of this section. They are not very active in politics but both take a good citizen's interest in public matters.

M. L. COFFIN,* cashier of the Commercial Bank, at Rawson, O., a position he has filled ever since the organization of this institution in 1902, was born in Rush County, Ind., June 27, 1877, and is a son of Zeno and C. (Gardner) Coffin.

Zeno Coffin was born in Rush County, Ind., where he spent his life, his death occurring in 1901. He was a blacksmith by trade. He married a daughter of Milton Gardner. Mrs. Coffin, who was born in Union County, Ind., still survives.

M. L. Coffin attended school more or less regularly until he was nineteen years of age, at which time he went into railroad work and continued until 1902, when he turned his attention to banking and has been a resident of Rawson ever since. He is an active and leading citizen of the place and for two years has been a member of the school board and of the board of health.

Mr. Coffin was married April 22, 1903, to Miss Dora Hawk, a daughter of John and Permelia Hawk, prominent farmers of Meigs County, O. Mr. and Mrs. Coffin have three children: Frank, Phebe and Milton. Mrs. Coffin is a member of the Methodist Episcopal church at Rawson and is active in the social life of the place. Mr. Coffin is a Mason and belongs also to the Knights of Pythias.

RUFUS FOREMAN, who is engaged in farming and stock raising in Eagle Township, Hancock County, O., was born on his present farm, October 15, 1864, and is a son of John F. and Margaret (Yates) Foreman.

John F. Foreman and wife were born in Pennsylvania and came early to Eagle Township with their parents. When the present Foreman farm was acquired it was entirely undeveloped land. John F. Foreman did considerable clearing and followed an agricultural life here. His death occurred in 1908 and that of his wife on January 11, 1898.

Rufus Foreman grew to manhood on the farm he now owns, a tract of eighty-two acres, situated within five and one-half miles of Findlay, to the southwest, in Section 9, Eagle Township. He has done a large amount of improving here and has erected all the substantial farm buildings on the place. He has his farm well stocked and makes a specialty of raising cattle, hogs and horses.

Mr. Foreman married Miss Catherine Yates, a daughter of Samuel B. and Mary (Oman) Yates. The former was an early settler here and died in Eagle Township, as did his wife. Mr. and Mrs. Foreman have no children of their own but they have been parents and protectors to two orphans, Edward Arnold and Hazel Yates, these children finding a home with them when but four years old. For ten years Mr. Foreman has been a member of the Junior Order of American Mechanics. He is a well informed and highly respected citizen of Eagle Township and is considered one of its best farmers.

HON. WILLIAM ROSS KINDER (deceased), was once one of Butler County, Ohio's most brilliant men, a lawyer of ability, a newspaper man of influence and a jurist of high character. His span of life was comparatively short, but within it he accomplished more than have many whose lives have been prolonged to four score years and ten. His birth took place at Franklin, Ohio, in December, 1826, and his death occurred on February 10, 1860.

From Holland came the first Kinders to America and the sterling qualities of their ancestry have always been more or less noticeable in the descendants. Philip Kinder, son of the settler, was born in Holland and he participated in the Revolutionary War, entering the Patriot army from Berks County, Pa. There lived his son, George Kinder, who was the father of Abraham Kinder, who came to Ohio in 1800, a pioneer, entering land from the government in Warren County. On the Warren County farm the father of Judge William R. Kinder was born, in the same year that the family settled in that wild section, and there he followed agricultural pursuits for a time and then became interested in traffic on the Miami and Erie Canal, owning and operating boats on that inland waterway. He died in 1863.

William Ross Kinder became a student of law in early manhood, his preceptor being Hon. John B. Weller, then a resident of Hamilton, Ohio, but subsequently governor and United States Senator of California. When Judge Weller was appointed a member of the government commission to determine the boundary lines between Mexico and California, he tendered the position of private secretary to his pupil, and they were thus associated until the satisfactory settlement of the contention. For two subsequent years they were law partners in San Francisco. In 1852 Mr. Kinder returned to the East and in the same year purchased the Hamilton Telegraph, a weekly newspaper, which, under his able management, increased in patronage and influence and he continued its publication until 1858, when he disposed of his interest in order to assume the duties of probate judge of Butler County. His record of two years on the Bench reflected only credit and his name is recorded with others of eminence of a period of particular importance, just preceding, as it did, the great Civil War, Judge Kinder died in harness, not having survived to finish his term of office.

In 1852 he was married to Miss Agnes Long, a native of Cincinnati, a daughter of Jacob and Maria (L'Hommedieu) Long. They had four sons, two of whom survive: Hon. Walter H. Kinder, who is judge of the Circuit Court of the Third District of Ohio; and Stephen L'H., who is identified with the Chicago and Michigan Railroad.

HARRY L. TARBOX, senior member of the firm of Tarbox & McCall, operators of a large stone quarry on Western Avenue, and manufacturers of cement block, porch columns, yard vases, etc., has been a resident of Findlay, O., since the spring of 1889. He was born April 24, 1858, in Cedarville, Greene County, O., and is a son of Samuel L. and Ruth L. (Jackson) Tarbox, and is a direct descendant of Andrew Jackson, seventh president of the United States.

Samuel L. Tarbox, a native of Maine, was for many years extensively engaged in the lumber business in Greene County, O., and in addition to his lumber operations was also a successful farmer and civil engineer. He was also interested in the stone quarries of Greene County. The mother of our subject was born in Greene County, O., a daughter of David and Mary Jackson. Her father, David Jackson, was born March 3, 1794, in Westmoreland

County, Pa., a son of Robert and Elizabeth (McCorkle) Jackson, who were married in 1786. Robert Jackson's father was David Jackson, and was a son by a second marriage of Dr. Joseph Jackson, who was born in 1690, in North Ireland. David Jackson emigrated to America in 1762 and located in Chester County, Pa., where he followed blacksmithing and farming for many years. He died in Lancaster, Pa. His stepbrother, Andrew Jackson, who was born of his father's first marriage, also emigrated to America, and in 1765 located in South Carolina, where, on March 15, 1765, was born his son, Andrew Jackson, the distinguished soldier and statesman, and the seventh president of the United States.

Harry L. Tarbox was reared in Greene County, O., and after leaving school began working for his father who operated a stone quarry, and has since made that his life occupation. In the spring of 1889 he came to Findlay, O., and leased and operated a stone quarry in the western part of the town until 1898. He then formed a partnership with Mr. McCall and opened their present quarry on Western Avenue at Findlay, and abandoned the old quarry. Mr. Tarbox is also largely interested in the development of coal lands in Columbiana County, O.

Mr. Tarbox was married March 12, 1884, to Essie Daugherty, who is a daughter of Eliphalet and Sarah Daugherty of Greene County, O., and they have the following children: Nellie; Frederick, who is a student at the Ohio State University at Columbus; Belle D.; Frank; and Edna and Edwin, twins. Mr. Tarbox is a member of the United Presbyterian church, and belongs to its board of trustees.

DANIEL W. FRICK, one of the leading citizens of Allen Township, Hancock County, O., who is engaged in general farming on a tract of 200 acres, which is located about one-half mile north of Van Buren, O., was born July 7, 1855, in Marion County, West Va., and is a son of David and Maria (Lenhart) Frick.

Daniel W. Frick was an infant when his parents removed to Iowa where his mother shortly afterward died. When two years of age he went to live with his uncle, Daniel Frick, of Van Buren, Hancock County, O., and there spent his early boyhood days. His uncle came to Van Buren in 1855 and engaged in the mercantile business and later also operated a grist mill. In 1871 he located on the farm now owned by his nephew, Daniel W. Frick, but spent his declining years at Van Buren, where his death occurred. Daniel Frick was the father of two children, both of whom died in infancy, and at his death he left his farm to our subject.

Daniel W. Frick attended the local schools of Van Buren, O., and has lived on his present farm since 1871. He carries on general farming and in the spring of 1909 added to the 160 acres left him by his uncle, a tract of forty acres, which he purchased from Joseph R. Kagy. He was married in 1885 to Lena Neuman, a native of Germany, who at the age of twelve years came to this country with her father, Frederick Neuman, who located in Hancock County, Ohio. Mr. and Mrs. Frick have one daughter, Virginia Frick.

Mr. Frick is a member of the Knights of Pythias, No. 473, at Van Buren, O.

WILLIAM G. WAGGONER, an enterprising farmer and much esteemed citizen of Marion Township, Hancock County, O., resides on a fine farm of 79½ acres located in Section 12, and has spent the greater part of his life in Hancock County, O. He was born March 4, 1840, in Jefferson County, Ohio, a son of Edward and Eliza (Allen) Waggoner, and a grandson of William Waggoner, who was a native of Germany and one of the early settlers of Jefferson County, Ohio.

William Waggoner and a brother came to this country to avoid military service, their father being a member of the German royalty. William first located in Pennsylvania, but later came to Jefferson County, Ohio, and located near Steubenville, where he resided until the time of his death. His brother went to Canada, and each thought the other dead until some years later, when a brother of our subject went to Canada on a visit. William married a Miss Jackson, who was a distant relative of President Jackson, and of their union were born the following children: John, Caleb, William, James, Edward, Josiah, Louisa, Jane, Sarah, Keziah, and Joseph, all now deceased.

Edward Waggoner, father of our subject, grew to manhood in Jefferson County, Ohio, where he was joined in marriage with Eliza Allen, also a native of that county. In 1849 they came to Hancock County and settled on a tract of timberland in Cass Township, where he built a log cabin and made a clearing. He subsequently sold this land and removed to Michigan, where he and his wife both died. They were the parents of seven children: Aaron Jackson, deceased, who served in the Civil War; William Glenn, our subject; Mary, who is the wife of David Reichard; James, who served in the Civil War; Samuel; Sarah, is the wife of Joseph Wang; and Keziah, who died young.

William Waggoner was reared in Cass Township, Hancock County, Ohio, where his parents settled when he was quite young, and his education was obtained in the old log pay school of this district. He assisted in clearing the farm, and when young worked at carpentering, and also worked as a tanner seven years, which was also his father's trade. He purchased 40 acres, and his wife inherited 40 of the Davis farm (80 acres in all) and follows general farming. He has cleared all the land with the exception of 25 acres, has erected all of the buildings, and has had five oil wells in operation.

Mr. Waggoner was married in 1866 to Rachel Davis, a daughter of William Davis, and sister of Isaac Davis. Three children have been born to our subject and wife; Edward, who married Laura Wisley, and is the father of three children—Catherine, William and Edward; (he is a resident of Lima, O., and is employed on the railroad); and Charles and Mary May, twins. Charles, who lives near our subject, married Catherine Fisher and has one daughter, Ruth. Mary May married John Welch of Kansas, and has two children: Helen R. and Mary Margaret. Mr. Waggoner is politically a Republican.

JOHN M. HAMLIN,* a representative member of the Hancock County bar and a well known resident of Mt. Blanchard, was born in Delaware Township, Hancock County, February 1, 1841, and is a son of Washington and Mary (Marshall) Hamlin. Washington Hamlin was born in Guernsey County, O., and in 1827 came to Hancock County and settled in Delaware Township, where he died in 1892. His widow survived until 1895. They were farming people and were well known and highly respected in Delaware Township.

John M. Hamlin attended the schools in his native township in early boyhood and later had better advantages at Findlay. From 1857 until 1862 he conducted a general store at Mt. Blanchard and at that time was the youngest buyer from the West in the eastern markets. In the latter year he became a student of law under the direction of Attorney Israel Brown, at Findlay, and in the fall of the same year entered a law school at Cleveland, where he was graduated. Later he was admitted to the bar in Guernsey County, where he practiced for one year and then returned to Findlay, was admitted to the Hancock County bar and engaged in the practice of law in that city for forty years. Mr. Hamlin then returned to Mt. Blanchard, where his first business venture had been conducted and has been one of the leading citizens ever since. In 1869 he was the candidate of the Republican party for prosecuting attorney of Hancock County but the Democrats gained the election in that campaign.

In 1861 Mr. Hamlin was married to Miss Mary Lockwood and eight children were born to them, namely: Abbott L., who was born January 25, 1862, and died August 20, 1882; Lulu, born August 6, 1863, who died June 11, 1865; a babe that died early; Florence, who was educated at Delaware College, married M. C. Shaffer, of Findlay, and they have three children—Richard, Mary C. and Morgan W.; Nellie C., who was also educated at Delaware College, and married Frank Preston McGuigan, of Pennsylvania; Ida May, who is a successful teacher at Portland, Ore.; Gale Leora, who was a graduate of the Findlay High School, and died April 30, 1900; and Arthur L., who was born August 20, 1883, and died April 25, 1885. Mr. Hamlin and family are members of the United Presbyterian church at Mt. Blanchard and he is president of its board of trustees.

CLINTON S. CORTHELL, deceased, formerly one of Findlay's capitalists and prominent business men, was largely identified with the oil industry for many years. He was associated with C. L. Casterline in the Genesee Oil Company, the Bradford Oil Company, and the Bradford Glycerine Company, and was a stockholder and director in several successful enterprises. For a number of years he was interested also as a stockman and dealt extensively especially in horses, being a fine judge of horse flesh and owning at different times many valuable animals. He was born in Hinsdale Township, Cattaraugus County, N. Y., in 1844, and died at Findlay, April 16, 1903.

Mr. Corthell was a self-made man and his remarkable business success was entirely brought about through his own efforts. He became interested in the Pennsylvania oil fields in 1864. He owned and for six years operated the stage line between Franklinville and Hinsdale, N. Y. For many years he was favorably known to the business men of Bradford, Pa., and in 1887 he moved from there to Findlay, O., where his natural good judgment again controlled his investments and eventually brought him the ample fortune which placed him among the city's capitalists. They valued his advice and consulted his judgment and in their reliance on his foresight, largely directed their investments. In the public affairs of Findlay, Mr. Corthell was also active and the same qualities which brought about his personal prosperity, contributed to the progress of the city when he was in a position to make use of them as a member of the city council, a position he held for some eight years. He was an old-time Democrat in politics and was zealous in support of Democratic principles although it was often said that he was as honest in politics as he was in business. He was a charter member of the order of Elks at Findlay and was valued highly by his fraternity. Perhaps no more generous, open-handed man ever lived at Findlay. Genial, kind and thoughtful with his friends, when appeals were made to his sympathy for the poor, needy or suffering, he was generous without limit. In his home life, his best qualities were manifested.

Mr. Corthell was married in Pennsylvania, in 1887, to Miss Mary A. Boyington, Mrs. Corthell and daughter, Frieda, enjoy a beautiful home at No. 218 Park Place, Findlay.

THEODORE KARN, one of the best known men of Cass Township, Hancock County, O., a lifelong resident and a member of an honorable old pioneer family, for many years has carried on general farming on his own place of sixty acres, situated in Section 15, and on thirty-eight acres belonging to his wife, in Section 14, both in Cass Township. He was born in this township, February 9, 1842, and is a son of Ezra and Elizabeth (Albertson) Karn, and a grandson of Valentine Karn.

Ezra Karn, father of Theodore, was born in Maryland and was a boy when he accompanied his parents to Ohio. His father, Valentine Karn, was of German extraction. He settled first in Holmes County and moved from there to Hancock County and subsequently died in Cass Township. He had ten children: Mary Ann, Joshua, Magdalena, Aaron, Ezra, Elizabeth, Abram, Samuel, David and Rebecca. All accompanied their father to Hancock County except Mary Ann, who married and lived in Holmes County.

Ezra Karn was about nineteen years of age when the family came to Hancock County. The farm his father secured had two or three acres cleared around a small log cabin, otherwise no improvements had been made and when the sons grew old enough they helped to complete the clearing of the land and assisted in its cultivating, making use of oxen in those days. Their nearest neighbors were the Albertsons, who had come from New Jersey and in the previous year, 1835, had also settled in the woods in Cass Township. They were New Jersey people, George Albertson, wife and daughter, Elizabeth, the latter being then sixteen years old. They had started on the long journey from New Jersey to Hancock County, O., with a one-horse wagon. It was strongly built and as Elizabeth walked almost the whole distance, safely transported the family effects until the party reached what is now the main thoroughfare of Fostoria, when it was so stalled in the mud that assistance had to be afforded before the travelers could proceed further. Ezra Karn subsequently married Elizabeth Albertson and eight children were born to them, Theodore being the second in order of birth. The others are as follows: William, who is now deceased—was a member of Co. G, 118th O. Vol. Inf., in the Civil War and suffered the loss of a leg in the battle of Peach Tree Creek; Drucilla, deceased, who was the wife of Fred Karrick, who is also deceased; Jerome, who lives in Cass Township; Simeon, who resides in Washington Township; Albert, whose farm is in Cass Township; Martin L., who resides at Findlay; and Mary E., deceased, who was the wife of George Taburn.

Theodore Karn attended the old log schoolhouse in the neighborhood of his father's house, with his brothers and sisters, but hard work early awaited farmers in those days and as soon as he was able to handle the hoe and rake there was daily toil for him. He assisted in clearing up the parts of the farm still in a wild condition and remained under the home roof until his marriage, when he purchased from the other heirs. He no longer attends personally to his farm, renting out his fields and also having others attend to the work necessitated by five producing oil wells on his property.

On November 15, 1883, Mr. Karn was married to Miss Mary E. Swisher, who was born at Ada, O., a daughter of Peter and Mary (Doty) Swisher. Peter Swisher was a soldier in the Civil War, a member of the 99th O. Vol. Inf., and while in the service was captured by the enemy and imprisoned for 100 days in Libby prison. He died at the home of Mr. Karn in Cass Township. Mr. and Mrs. Karn have four children: Grace V., who is the wife of John Barnhouse, of Van Buren, O.; and Jennie, Edwin S. and Hazel A. In politics, Mr. Karn is a Democrat. He has served in township offices, having been school director and supervisor and for two years was a justice of the peace. He has witnessed many changes during his long life in this section, in methods of farming, ways of transportation and standards of living. As he swiftly moves over the fine country roads in his handsome new model Ford automobile, he can scarcely fail to contrast it with the ox-team which he used in his boyhood. Mr. Karn is one of the men who has kept up with the times and having helped bring about more comfortable ways of living, does not hesitate to enjoy them.

SAMUEL S. FRANKS,* township trustee and an extensive agriculturist of Allen Township, Hancock County, Ohio, is the owner of two tracts of farm land, the one on which he lives consists of 112 acres and is located just east of Van Buren, Ohio, and the other consisting of 102¼ acres, is located one and a half miles north of Van Buren. He was born March 13, 1874, in Cass Township, Hancock County, Ohio, and is a son of Jasper and Martha (Smith) Franks.

Jasper Franks was born in Pennsylvania and at an early age came to Hancock County, Ohio, with his father, John Franks, who was one of the earliest settlers of the county. Jasper Franks married Martha Smith, who was born in Seneca County, Ohio, and they began housekeeping in Cass Township, Hancock County, where they followed farming some years. Later in life Jasper Franks moved to North Baltimore, where he lived in retirement some years, but he subsequently returned to Hancock County, and passed out of this life at Van Buren, Ohio, July 13, 1901. The mother of our subject died on the farm in 1899. Four children were born to the parents of our subject: John Franks; Evaline, who is the wife of George Peffly; Samuel S., the subject of this record; and Della, who died in February, 1907, and who was the wife of William Alworth.

Samuel S. Franks was ten years of age when his parents removed to Findlay, where they resided but two years. They then settled on the old Franks farm of 102¼ acres in Allen Township, and subsequently fell heir to the land, which is now owned by Mr. Franks. Mr. Franks was married in 1899 and began housekeeping on this farm, and in the fall of 1909 bought the old Henry Franks farm of 112 acres just east of Van Buren in Allen Township. Mr. Franks resides on the latter property, but farms both places, and makes a specialty of raising poland china hogs in connection with general farming.

Mr. Franks was married in 1899 to Jessie Lauer, a daughter of Nicholas Lauer and they have two children: Martha Elizabeth, and Samuel Eugene. In politics Mr. Franks is a Democrat and in the fall of 1907 was elected trustee of Allen Township, and re-elected to that office in the fall of 1909, his present term expiring January 1, 1912. He is fraternally affiliated with the Knights of Pythias, No. 473, of Van Buren.

JAMES T. ADAMS, deceased, formerly president of the Adams Brothers Company, at Findlay, Ohio, one of the city's important manufacturing concerns, was identified not only with the development of this business from its infancy, but was also connected with many other important enterprises. Mr. Adams was born April 22, 1825, and his death occurred April 10th, 1906. His native place was Perry County, Pa., and from there, when ten years old, his parents brought him to Ohio. His father was Rev. William Adams, who settled in Wayne County in 1837 and came to Findlay in 1860.

The Adams family to which the late James T. Adams belonged, is of English extraction, of colonial settlement and of Revolutionary stock. Mr. Adams, however, was a man who needed no background of distinguished ancestry to impress those with whom he came in contact, although their sterling traits of character may have had a hereditary influence in the makeup of his own. From the age of fourteen years he provided for his own maintenance. At that age he began to learn the tinsmith's trade at Massillon, Ohio, where he lived until 1845. He then went to Plymouth and continued work there until 1854, when he came to Findlay. He continued work as a tinsmith until 1864 and then opened a general hardware store which he conducted for about six years, selling out in order to enter—rather extensively for the time—into the manufacture of linseed oil. This industry he continued until 1878, when, in association with his brothers he organized the foundry and machine business which is continued under the style of the Adams Brothers Company. In 1890 the business was incorporated, James T. Adams becoming president, and Newton Adams, treasurer. The enterprise has grown steadily, while in all Western Ohio no firm name stands higher in the trade than that of Adams Brothers.

For fifty-five years the late James T. Adams was identified with Findlay's interests and these he frequently made personal ones. With fidelity to the public he served for sixteen years on the city council where his practical common sense and sound business advice made him an invaluable public servant. He was equally useful as a member of the school board, and was the promoter of many of the benevolent enterprises which have made Findlay notable in charitable records. The Adams Building, which he erected in 1902, is one of the handsomest and best equipped business structures in the ctiy.

Mr. Adams was married in 1849, to Miss Harriet L. Bodine, who was a daughter of Peter Bodine, formerly of Richland County, Ohio. Three children were born to this union, the two survivors being: Charles F. and Lizzie. The latter married John A. Meeks and they reside at Findlay. Mr. Adams was married in 1902 to Mrs. Catherine Elmes, a native of Findlay. She was a daughter of Simon Ransbottom, a farmer of Hancock County. Mrs. Adams occupies her comfortable home at No. 203 East Hardin Street, Findlay.

In his political views, Mr. Adams was a Republican. He was a member of the Presbyterian church and a generous supporter of many of its benevolent movements. From early manhood he had been identified with the fraternal order of Odd Fellows, being in fact the oldest continuous member in Hancock County, and belonged to both the primary branch and to the Encampment.

The following remarks, which are part of an extended notice which appeared in a local paper on the occasion of his death, will serve to show the esteem in which he was held by the citizens of Findlay and of the county generally:

"In the death of J. T. Adams the city of Findlay loses one of its foremost citizens and his family a good father and friend. He was a self-made man, by his own efforts rising to wealth and influence, and by his example forming an object lesson that the young men of today might do well to emulate. He spent the greater portion of his life in Findlay, witnessing its growth from an obscure village to its present splendid proportions, and he materially assisted in such growth, spending very many thousands of dollars in its upbuilding and expending millions among working men and for material during his long and busy career in this city. He has truly been a benefactor to his fellows, and while not of a demonstrative disposition, possessed a warm heart and generous nature, and the friends he made were always steadfast and staunch."

Such indeed was Mr. Adams—a man who will not soon be forgotten by any of those with whom he came into personal contact.

JAMES M. BARR,* who for many years was identified with the oil and gas industry, and served four years as postmaster of Findlay, O., was born June 27, 1847, on his present residence property at No. 200 W. Front Street, Findlay, Ohio, a son of James H. and Mary (Shaw) Barr.

James H. Barr was born in Fairfield County, Ohio, and in early manhood came to Findlay, Ohio. He was one of the pioneer merchants of Findlay, being a member of the old firm of Taylor and Barr, and was the first probate judge of Hancock County, in which capacity he served two terms.

James M. Barr was reared in Findlay, Ohio, and after obtaining an education in the schools of this city, went to New York City, where he spent six years working in a wholesale house. He then returned to Findlay, Ohio, where he succeeded S. C. Moore as postmaster, receiving his appointment during Cleveland's last administration. Since the close of his term as postmaster, Mr. Barr has devoted his time to the oil and gas business, but is now not actively engaged in business.

Mr. Barr was united in marriage with Laura P. Starr, who comes of one of the prominent families of Wyandot County, Ohio, and is a daughter of Hiram J. Starr, deceased, who was one of the prominent farmers and stockmen of that county. Mr. Barr is identified with the Democratic party in politics, and has served as councilman and in various other offices. He is fraternally a Mason.

JOHN W. ZELLER, state school commissioner, one of Ohio's earnest and effectual men in the educational field, for more than thirty consecutive years was superintendent of the schools of Findlay. With almost a parent's interest he watched them develop from a primitive state with more or less crude methods of instruction to the highly organized and thoroughly representative educational bodies they are today, in all their features reflecting the scholarly influence he has brought to bear in this long period of association. Prof. Zeller was born January 22, 1849, in Union Township, Hancock County, Ohio, coming of solid, substantial, virtuous and frugal German parentage.

When seventeen years of age, having made the most of his afforded opportunities in the district schools, he began to teach school, and after six years found himself able to enter the Ohio Normal University at Ada; in 1874 he was a member of the first graduating class of that institution. After more schoolroom work, in Logan County, Ohio, where he was school superintendent for two years, he entered Mt. Union College where he earned the degree of Ph. B., from which college he also received later the degree of Ph. M. He subsequently took up the study of languages at the Ohio Normal University, where he also acted as a tutor; he studied political economy at Ann Arbor, Michigan, and later at Findlay College, where he obtained the degree of Ph. D., in 1892.

In 1877 Professor Zeller was first appointed superintendent of the Findlay schools, with sixteen teachers, three buildings and fifteen schools under his charge. A comparison shows in some degree what he has accomplished in the way of advancing the material possessions of the city in this line. There are, in 1910, ninety-four teachers, fourteen buildings and one of the finest High School buildings in the state. These structures are modern in every particular, their equipments being such as to give students the advantages which their fathers could scarcely have obtained in college or academy in their pupil days. To estimate the work done and progress made in intellectual advancement by Professor Zeller, would be a difficult task, but it may be indicated by the fact that graduates from the Findlay High School take precedence generally in any intellectual contests where opportunities are afforded them for competition.

Professor Zeller has long been an important factor in every organization in the state devoted especially to the advancement or the advantage of teachers. He was one of the founders and served several times as president of the Northwestern Ohio Teachers' Association. For years he has conducted institutes all over the State, and in the fall election of 1908 he was chosen State School Commissioner by a plurality of 46,559. So closely has he applied himself to the educational interests of his section that purely business enterprises have never appealed to him to any great extent; but he early became interested in the development of natural gas and was a member of the company that drilled the first gas well in Ohio, this being the memorable event of the year 1886 in Findlay. Together with his interest in all that pertains to the public weal of his fellow citizens, he takes active part in the Findlay Y. M. C. A. He is a member of the Methodist Episcopal church, of which he has been a steward, and was one of the prime movers in the erection of the Howard and Heck Methodist churches at Findlay. In politics he is a Republican. His handsome residence is located at No. 311 East Lincoln Avenue, Findlay.

M. D. NEFF,* senior member of the firm of M. D. Neff & Co., lumber dealers and operators of a planing-mill and saw-mill, with works and yards on Fair Street, at the junction of Main and the L. E. & W. Railroad, Findlay, Ohio, is a thoroughly experienced man in this business, being only eighteen years of age when he became his father's manager in the same line. He was born at Fremont, Ohio, November 6, 1860, and is a son of M. T. and Samantha (Turner) Neff.

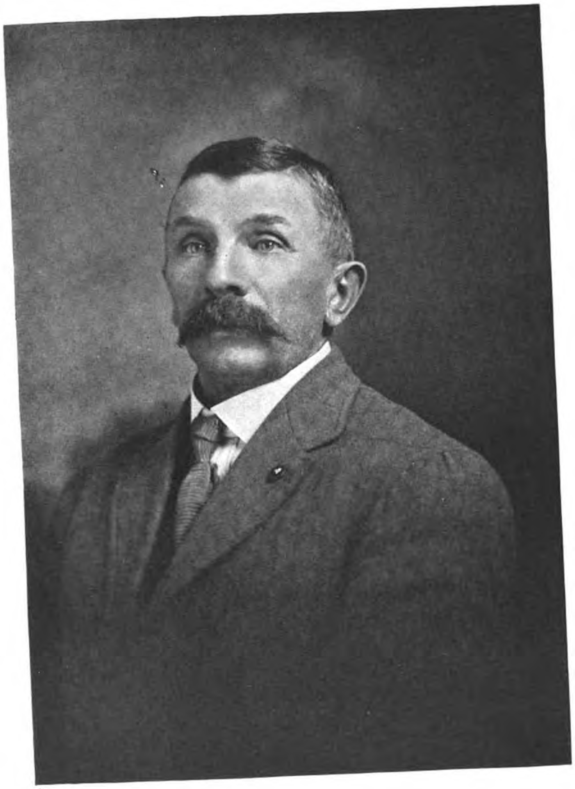
M. T. Neff was born in 1832, at Fremont, Ohio, where he was reared and there entered into the lumber business and operated extensively, at one time having three saw-mills on the Sandusky River. He extended his interests to Michigan, where he dealt by wholesale and it was while occupied there that he was seriously injured. He transferred his interests to Findlay, in 1878, and continued in the business, under the style of the M. T. Neff Lumber and planing mill, until his death, in 1903.

M. D. Neff was reared and educated at Fremont and from boyhood has been interested in the lumber business, giving his father assistance even before he left school. When the father died, Mr. Neff, together with his sister, Lucretia Neff, bought out the other heirs and changed the firm style to M. D. Neff & Co., and the business has been prosperous ever since, employment being given to from twelve to fifteen men. Mr. Neff was married to Miss Etta Belle Jones, of Pittsburg, Pa., and they have one child, Mildred. Mr. Neff belongs to the Elks.

FRANK KARST, senior member of the firm of Karst and Laffey, well known grocers of Findlay, Ohio, has been a resident of Findlay since 1849. He was born March 29, 1827, in Badenheim, near Bingen on the Rhine, Hessen Darmstadt, son of Martin and Elizabeth (Bertram) Karst.

Frank Karst was reared in Germany and at the age of fourteen years began working as a clerk in a hardware store. He later became identified with a wholesale notion store, and in 1849 came with his parents to America. The family stopped for a few months in Reading, Pa., with a brother of our subject, but subsequently located on a farm in Eagle Township, Hancock County, Ohio. Mr. Karst was unable to endure the hardships of clearing the land, and came to Findlay in 1849, where he spent the first month working in a dry goods store, but later clerked one and a half years in a grocery store.

In the spring of 1852 he established himself in the grocery business on Main Street, in what is now the Kimmel Block and was associated in that business with his brother Jacob until 1858, when he purchased his brother's interest in same. In 1855 he purchased the property where the Edwards Shoe Company is now situated, and three years later traded that for the property upon which the Mystic Theatre now stands. In 1866 he built and rented out the building and in 1870 he purchased the building on the corner of Main and Main Cross Streets, and in 1872 moved his store. In 1887 he formed a partnership with Fred Kwis and conducted the business until 1890, when the old building was torn down and the present building erected. In 1896 he bought the stock of Gayer & Davis and associated himself with R. M. Wise. In 1900 he sold his interest to Shafer & Wise and bought the stock of Keiffer & Nonnamaker and the concern is now known as the firm of Karst & Laffey, where they have been for ten years. Mr. Karst erected the first



AUGUST NEUMAN

house in the Vance addition to Findlay in 1854.

Mr. Karst was married to Anna Maria Schneider (born in Bregens, Austria, on Lake Constance), and of this union were born eight children—Frank L., Joseph P., Amelia, Catherine, Julius, Adeline, August and Martin—of whom two survive, one son and one daughter. The mother, Joseph P., and Frank L. (he left three children of whom one, Edward, survives) all died in 1881; Amelia, Julius and Martin died young, and Adeline died October 8, 1909. August lives at home and Catherine is the wife of Michael Laffey, who for the past fourteen years has been associated with our subject in business. She is the mother of five children—Mary, Martha, Frank, Charles (deceased, and Claire. The father of our subject died in 1880 aged ninety-three years and five months.

Mr. Karst is a member of the Roman Catholic Church and has been a liberal contributor. He is affiliated with the Knights of Columbus and the Roman Catholic Benevolent Society. He has served as member of the town council and was trustee of the water works at the time the new water works system was built.

AUGUST NEUMAN, president of the Board of Infirmary Directors of Hancock County, Ohio, and member of the Agricultural Board of the county, was born February 13, 1856, in Mecklenberg, Germany, a son of John and Louisa Neuman.

August Neuman was fourteen years old when he journeyed to this country with his parents, who came at once to Hancock County, Ohio. The family lived a short time with Rudolph Neuman, an uncle of our subject's father, but later settled on a farm in Portage Township, where our subject grew to manhood. He worked as a farm hand until 1879 and after his marriage rented his father-in-law's farm in Pleasant Township until 1881. He then bought part of the farm, but later sold it back to his father-in-law, and purchased a farm of eighty-three acres in Portage Township, where he followed general farming until locating in Findlay, on March 24, 1910. He then sold the farm and bought a tract of 167 acres in Portage Township, just one mile east of the old farm. In the fall of 1908 Mr. Neuman was elected a member of the Infirmary Board on the Democratic ticket and assumed the responsibilities of that office January 4, 1909. At the first meeting of that body he was elected its president, and is now serving his second term as a member of the Board of Agriculture of Hancock County, having been elected a member of the same in 1908.

Mr. Neuman was first united in marriage with Sarah Brickman, who was born in Hancock County, Ohio, a daughter of Frederick Brickman, and of their union were born three children: Anna, who is the wife of E. W. Bonham, of Oklahoma, and has two children, Sara Janet, and Harold Neuman; J. Fred, who lives on our subject's farm in Portage Township, and married Bertice Moorehead; and Clara Elizabeth, living at home. Mrs. Neuman died in 1892 and he subsequently married Lucinda Collingwood, who died in 1895. He then married Angeline Montgomery, who was born in Portage Township, Hancock County, Ohio, and is a daughter of George and Dorothy Montgomery. Mr. Neuman is fraternally a member of the Maccabees, and has served as a member of the school board and as trustee of Portage Township.

George Montgomery was born in Wayne County, Ohio, October 11, 1823, and was the only child born to John and Nancy (Helmick) Montgomery, the former being killed by a falling tree, when George was but one year old. George Montgomery was reared by his maternal grandfather, Nicholas Helmick, who came to Hancock County, Ohio, in 1832, and settled in Cass Township. His grandfather served in the War of 1812. Mr. Montgomery took up auctioneering and became one of the best known auctioneers in this part of the country. He also became a large land owner and at one time owned a tract of 1,400 acres. Mr. Montgomery was first married in 1844 to Mary Chase, a daughter of George Chase, who was one of the pioneers of Hancock County. She died in 1861, and he later married Dorothy A. Culp, who was the mother of Mrs. Neuman, and a daughter of Benoni Culp. Mr. Montgomery served as the first postmaster of Portage Center, which was the second post-office opened in Hancock County. His death occurred in 1895.

ADAM RETTIG,* who is a general farmer in Jackson Township, Hancock County, Ohio, where he owns forty acres of land, was born in Van Buren Township, Hancock County, October 15, 1859. His parents were John and Katherine (Pifer) Rettig. Both were born in Germany and they came to America about sixty years ago, landing at New York and coming immediately to Hancock County, Ohio, where the father purchased land.

Adam Rettig grew to manhood on a farm and has carried on farming and stock raising ever since he grew old enough to use farm tools. He is a very practical, sensible man and thoroughly understands his business. Mr. Rettig was married March 6, 1886, to Miss Annie Appeld, a daughter of Fred and Paulina (Marolion) Appeld, and they have had six children: Charles, who died in infancy; Linda, who is married to August Clish and they live on a farm in Madison Township; Mary and Sherman, who reside at home and are attending school in Jackson Township; and Clara and Ernest, both of whom died when young. Mr. Rettig and wife are members of the German Lutheran church at Arlington. He has always voted the Democratic ticket.

JOHN MELVIN BYAL, one of the leading citizens of Pleasant Township, who has spent his entire life in Hancock County, belongs to an old pioneer family of Ohio. His farm of 120 acres is devoted to general agriculture and the raising of stock. He was born in Findlay Township, August 14, 1865, and is a son of Campbell and Anna (Pendleton) Byal.

The Byal family originated in Ireland. The grandfather, John Byal, settled in Findlay Township, Hancock County, near the site of the Infirmary and he built a mill west of Findlay. The father of John M. Byal followed farming in Findlay Township and died in 1881. The mother still survives and resides at Findlay. She was born in 1836 in Hancock County, a daughter of Joel and Amy Pendleton, both of whom died on their farm one and one-half miles west of Findlay. For forty years he was county surveyor of Hancock County. John M. Byal is the eldest of his parents' family of six children and the three other survivors are: Nora, who is the wife of W. E. Gorrell, of Findlay; and Clement and Leslie, both of whom reside in Findlay Township.

John M. Byal obtained his education in the public schools of Findlay Township, after which he engaged in farming and continued to reside there until he was twenty-three years of age, when he moved to Blanchard Township. Mr. Byal was a resident of that township for twenty-two years and then came to his present farm. He has a very desirable and valuable property here in which he takes much interest, carefully cultivating his land and growing some very fine stock.

Mr. Byal was married to Miss Frances Cornwell, a daughter of D. J. and R. Cornwell, on March 29, 1888, and they have four children—Fern, Lester, Gladys and Frederick—all of whom reside at home. Mr. Byal and family are members of the United Brethren church. He is identified with Lodge No. 354, Odd Fellows. Nominally he is a Democrat, but in local elections he generally uses his own judgment about candidates, putting the man and his record before party.

THOMAS C. LINGER,* manager, and—in association with his father, P. F. Linger, of Clarksburg, West Virginia—owner of the Ohio Hay and Grain Company, at Findlay, Ohio, has been established in business in this city since February 1, 1904. He was born in Ritchie County, West Virginia, February 14, 1873, and is a son of P. F. and Susan E. Linger.

P. F. Linger is one of the old residents and substantial men of Ritchie County and he still continues to manage his farm there, together with a general store in which he has been also interested for some years, while he has additional interests at Clarksburg and at Findlay.

Thomas C. Linger was reared through his school period on the home farm and obtained his education in the country. He then decided to learn telegraphing and when fifteen years of age left the farm and as his brother was station agent at Parsons, West Virginia, he went there for instruction. As he was apt and reliable he later became an excellent operator, subsequently succeeding his brother there and still later being sent as operator to other points on the West Virginia Central Railroad. After four years of railroad work, Mr. Linger turned his attention in another direction and took a course in stenography and bookkeeping, at Parkersburg, West Virginia. In 1898 he went into the grain business, starting in with the Marietta Brokerage Company, of Marietta, Ohio, and after being with that firm for four years, going to Clarksburg, where he was manager of the branch house of the Ohio Hay and Grain Company, which is still continued. From there he came to Findlay. The Ohio Hay and Grain Company is a very large concern and has prospered from the start. In the spring of 1910 the company increased their Findlay facilities by erecting a grain elevator of about 100,000 bushels capacity. They handle hay, flour, and grain and employ ten people, while, during the summer seasons they have several hay pressers at work all over the country and during the busy seasons have from forty to fifty extra men on the pay roll.

Mr. Linger married Miss Alice Peters, of Louisa, Kentucky, and they have one child, Virginia. Mr. Linger is a member of the order of Knights of Pythias and belongs to the United Commercial Travelers' organization.

WILLIAM H. HOUCK, one of Findlay's most highly esteemed retired citizens, for many years engaged in farming and stock raising on his valuable estate consisting of 200 acres, which is situated in Jackson Township, Hancock County. Mr. Houck was born March 4, 1827, in Baltimore County, Maryland, just ten years before his parents settled in the wilderness of Jackson Township. They were Jacob F. and Eve (Ebaugh) Houck.

For seventy-three years the Houck family has been identified with the interests of Hancock County, during this long period contributing in no small degree to its development along every line of progress. The father of Mr. Houck was a native of Maryland and his mother of Pennsylvania, both coming of the sturdy stock that ensured vigorous bodies and strong minds to their offspring. Of their ten children, eight grew to manhood and womanhood and five of this generation still survive. Jacob F. Houck was a representative man of his time and section, one who served his township in many responsible offices with efficiency and set an example to his neighbors in industry and public spirit. For many years he and wife were among the leading members of the Methodist Episcopal church.

William H. Houck, as the eldest of the family, had fewer advantages in education and earlier responsibilities than his brothers and sisters. He became his father's main dependence in clearing up the wilderness farm, which preceded the same kind of hard work for himself, Mr. Houck having the record of having cleared 200 acres of virgin soil in Hancock County. Since 1863 he has owned his present valuable farm in Jackson Township, one of the best improved and best stocked in this section of the county. He was one of the most enterprising agriculturists of his locality in his prime and owned the first buggy in his township and bought the first grass-cutter in Hancock County. In 1902 he came to Findlay to make his home with his youngest son, Willie E., his wife having died in September, 1899. At different times during his residence in Jackson Township, Mr. Houck responded to the wishes of his fellow citizens and served in township offices, but he has never been a seeker for political honors. In looking back over his long life he has the consciousness that as far as he has been able, he has lived usefully and there is nothing to mar his serene old age, but much to bring him comfort.

Mr. Houck was married in 1852 to Elizabeth Smaltz, a daughter of Henry Smaltz, of Hancock County, and to them were born the following children: Solomon F., Adam B., Catherine E., Annie M., Lottie A., John P., Jacob H., Robert C., Perry H., and Willie E. John P., residing at No. 205 West Hardin Street, Findlay, is connected with the T. & O. C. Railroad Company; Jacob H., resides at Rochester, Pa.; and Willie E., residing at No. 605 West Hardin Street, is general manager of the Boss Manufacturing Company. The latter married Miss Gail Grindle and they have two children. For more than a half a century, William H. Houck has been a class leader in the Methodist Episcopal church and a licensed exhorter for about the same time.

DR. J. R. TROVINGER,* one of the leading physicians of Arlington, Ohio, who has been engaged in the practice of his profession since 1889, was born May 17, 1864, in Perry County, Ohio, and is a son of Curtis and Mary (Neal) Trovinger.

Curtis Trovinger was a native of Maryland and came to Ohio with his father, John Trovinger, who settled in Fairfield County. He later removed to Perry County, where he followed farming until the time of his death. The mother of our subject also died in Perry County.

Dr. J. R. Trovinger grew to maturity in

Perry County, Ohio, and attended the local schools and the Thornville High School, from which he graduated in 1884. He then taught in the schools of Arkansas and Perry County for four years, and in 1887 entered the Columbus Medical College of Columbus, Ohio, from which he graduated with the class of 1889. He immediately embarked in the practice of medicine at Arlington, Ohio, where he has since been continuously and successfully engaged in his profession.

Dr. Trovinger is fraternally a member of the Maccabees, No. 179, of Arlington, of which he is past commander, and was for six years surgeon, and also affiliates with the I. O. O. F., No. 184, of Thornville, of which he is past grand commander; also of the Sons of Veterans, of which he was elected junior vice commander at Xenia, Ohio, on June 14, 1910. He was United States Pension Examiner under Presidents Cleveland and McKinley, and also served one term as Mayor of Arlington. Dr. Trovinger was united in marriage with Hettie Solt, who was born and reared in Eagle Township, Hancock County, Ohio, and they have always resided at Arlington.

EDMUND C. TAYLOR, president of the Commercial Banking & Savings Company, at Findlay, and also president of the Findlay Foundry & Machine Company, has been identified with the various interests of this city for more than twenty years. He is a native of Ohio, born September 2, 1851. He was liberally educated and after completing his course in Oberlin College, became intensely interested in the development of oil in the Pennsylvania oil fields, which was then attracting the attention of the world.

During the first eighteen months of his practical interest in this great industry, Mr. Taylor was located at Oil City and then went to the Butler County fields and for the six succeeding years took part in the activities of that section, learning during this time the stoicism necessary to bear the alternations of fortune arising from speculation. He acquired capital and in 1878 opened a nitro-glycerine factory at Bradford, using this explosive in the shooting of wells for prospectors. He was engaged in this work for seven years, when he became an oil producer, in 1881 locating at Richburg, N. Y., where he continued until 1886, and then came to Findlay. Mr. Taylor was connected with the first well drilled for oil in this section and is practically one of the pioneers in the industry here. He has never entirely given up his oil interests, having with them laid the foundation for his ample fortune, but his active participation in the industry has long since been abandoned, other important enterprises claiming his time and close attention. Since January, 1901, he has been at the head of the Commercial Banking & Savings Company, a leading financial institution of this section of Ohio. He owns a finely improved farm of 117 acres. Without being a politician, Mr. Taylor is an earnest Republican and a vigorous supporter of all measures looking to good government. He is charitable to a large degree and a willing promoter of public spirited enterprises whether for a special benevolent purpose or for the general welfare.

Mr. Taylor was married in 1889 to Mrs. Thirza (Ostermeyer) Moore, of Findlay, and their handsome residence stands at No. 222 Center Street, Findlay. Mr. Taylor is a 32nd degree Mason and belongs also to the Knights of Pythias and the Odd Fellows. Personally he is genial and frank and counts his friends by the score.

OLIVER POWELL,* a retired farmer and highly respected citizen of Findlay, Ohio, residing in a very pleasant and attractive residence situated at No. 608 Center Street, came here from his farm in 1900 and has continued to live here for the past ten years. He is a valued member of the G. A. R. Post at Findlay, having served in this organization as chaplain and commander and gained admission to this body on account of his loyal service in the Civil War. Mr. Powell was born November 21, 1834, on a farm stuated in Liberty Township, Hancock County, Ohio, three miles southwest of Findlay, and is a son of Henry and Catherine (Fellers) Powell.

Henry Powell was born in Pennsylvania and lived there until after his marriage when he came to Fairfield County, Ohio, and in 1830 to Hancock County, where he entered land in Liberty Township. He developed an excellent farm and lived there until his death in 1876. He was married first to Catherine Fellers, who died in 1838, and secondly to Rebecca Myers.

Oliver Powell was reared on the farm in Liberty Township and attended the old log school that was not far distant from his home. He engaged in farming and in 1858 built a saw-mill and operated it until October 15, 1862, when he enlisted for service in the Civil War. He became a member of Company H, 10th O. Vol. Cav., and remained in the army until the close of the War of the Rebellion, a period of two years and eight months. With his comrades, Mr. Powell passed all through the Tennessee campaign, mainly doing scout duty, and afterward was under Sherman in the great march to the sea; he was present at the fall of Atlanta and participated in many of the most stirring events of that section. He did not escape all the dangers of war. When near Raleigh, North Carolina, his commander was surprised by a larger force and Corporal Powell, together with about 200 of his comrades, was taken prisoner. The whole party was marched to Richmond and for two days Corporal Powell had a realization of what Libby Prison was like. This was in the spring of 1865 when the Confederates were no longer anxious to keep their prisoners and within two days he was paroled and was given a furlough home by his commander for thirty days. At its end he reported at Columbus but just then an order came from the Government that all paroled prisoners should be mustered out and with this welcome news he was soon on his way home.

Mr. Powell was married on Christmas Day, 1868, to Miss Rachel Comer, who was born in Liberty Township, and died in 1900, at Findlay. Mr. and Mrs. Powell had six children: Blanche, who is a teacher in the McKee school at Findlay; Grace, who died aged one year; James Powell, who is an engineer on the Lake Shore Railroad and lives at Dunkirk, New York; Gertrude, who is the wife of Roy Flucke, of Findlay; Otto, who died aged two years; and Herbert, who died when seventeen years of age. Mr. Powell continued to live in Liberty Township until 1882 and then moved to his farm of eighty acres near Mt. Cory, which he sold prior to coming to Findlay in 1900. He has been identified with the Republican party almost since its organization but he has never been willing to accept public office. From his youth he has been a member of the Evangelical church. For years he has been prominent in the Grand Army and is very well known in the organization.

BENJAMIN REDICK, whose valuable farm of 200 acres, lies in Eagle Township, Hancock County, twelve miles southwest of Findlay, Ohio, on what is known as the Redick road, has lived here for the past seventeen years. He was born in Van Buren Township, Hancock County, February 16, 1873, and is a son of Adam and Christina Redick.

Adam Redick and wife were both born in Germany. He was brought to America by his parents in boyhood and spent his subsequent life in Van Buren Township, Hancock County, Ohio, as a farmer, dying there in 1883. His wife was five years old when her parents brought her to the United States and she survives and resides with her son, Henry Redick, on the homestead in Van Buren Township.

Benjamin Redick remained at home and helped his father until he married, in 1893, when he settled on his present farm, the old Arras homestead. He carries on general farming and raises considerable stock, none of it thoroughbred but all profitably marketable. He has given much attention to improving the place, putting down a large amount of tile and building a modern and exceedingly comfortable farm residence, together with barns and other structures made necessary as his farm industries have been developed.

Mr. Redick was married September 21, 1893, to Miss Maggie Arras, who was born on the farm which has been her home all her life, December 27, 1875. Like her husband she was educated in the township shools. She is a daughter of Peter and Elizabeth Arras, who many years ago settled in Eagle Township where they became leading and respected people. Peter Arras died in 1897 but his widow survives and lives at Jenera, Ohio. Mr. and Mrs. Redick have had five children, namely: Esther, Harley, Lulu Estella, Clarissa and William. Three times has the dread Angel of Death invaded this household. Lulu Estella died October 22, 1897, aged one month and two days. Clarissa died July 26, 1903; William died March 23, 1905. Mr. and Mrs. Redick are members of the German Lutheran church at Jenera.

M. C. SHAFER,* a prominent member of the Hancock County bar and a representative of one of the old pioneer German families of Ohio, was born at Findlay, Ohio, December 4, 1866, and is a son of Morgan D. and Mary L. (Buntz) Shafer.

The late Morgan D. Shafer was born in 1838, at Mt. Blanchard, Hancock County, Ohio, and was one of a family of twelve children born to his parents, Michael and Nancy (Ireland) Shafer, and a grandson of Michael Shafer, who, with a brother, came to America from Germany, and settled in Washington County, Pa. This first Michael Shafer married there and remained until his son Michael was about thirteen years of age, when he moved to Knox County, Ohio. The second Michael Shafer, who was the grandfather of M. C. Shafer of Findlay, was the pioneer of the family in Hancock County, where he acquired property and reared a large family. Throughout life he maintained his old ideas of German thrift and when his children grew old enough to desire more extended educational advantages than the local schools offered, they were required to provide themselves with the means, although at that time he was amply able to give them assistance. Thus, when Morgan D. Shafer found the environments of the farm too narrow for his ambitions, he left home and taught school until he had earned enough to take a law course in the Ohio Wesleyan University, being admitted to the bar in 1860. In the following year, however, when the Civil War broke out, he put aside his personal plans and responded to the first call for troops, entering the Federal Army as first lieutenant of Company E, 21st O. Vol. Inf. After the end of his term of enlistment he came to Findlay and entered upon the practice of his profession, which he adorned for many years, his death occurring in 1899. He married Mary L. Buntz, who was born at Ellsworth, Mahoning County, Ohio, where her family was exceedingly prominent. She survives and resides with a daughter, Mrs. Dr. Jones, at Cleveland, Ohio.

M. C. Shafer was reared at Findlay and was graduated from the Findlay High School in the class of 1885. His father owned 600 acres of land in Hancock County and Mr. Shafer became interested for a time in farming and during one winter he taught a school in Marion Township. He then spent one year at Findlay College, after which he entered the University of Michigan, where he devoted two years to literary studies in general and two more to the special department of law, being graduated in 1893. Immediately after his return to Ohio and admission to the bar he established himself in his present convenient offices at No. 407½ Main Street, Findlay. Mr. Shafer's practice is general, requiring much knowledge along many lines, and he has earned a foremost place among a notable body of professional men.

Mr. Shafer was married at Findlay, in 1893, to Miss Florence Hamlin, a daughter of John M. Hamlin, and they have three children: Richard H., Mary C. and Douglas M. Mr. Shafer has club connections and fraternal affiliations and is particularly active in the Elks, the Knights of Pythias and the Modern Woodmen.

GEORGE W. NORRIS, a representative citizen of Cass Township, who, together with his wife, owns 250 acres of very valuable land, was born on his father's farm in Fairfield County, O., July 27, 1846, and is a son of Alexander and Maria (Stone) Norris.

Alexander Norris was born in Maryland, a son of English parents, and came to Fairfield County, O., when a young man of twenty-seven years, where he established himself as a shoemaker. He was married to his first wife there and after her death he married Maria Stone, who was born in Virginia. She died in 1892, aged eighty-one years and he survived until 1898, dying at the age of ninety years. To the first marriage four children were born, namely: William, deceased; Mary Frances, wife of Samuel Mosier, of Findlay; and Elizabeth Ann and Sara J., both deceased. Three children were born to the second marriage: George Whitfield, David L., and Anna, wife of H. Borroughf, of Pleasant Township. In 1852, Alexander Norris and family came to Hancock County, where he bought twenty acres in Marion Township, then added forty acres and then a second forty acres and still later, 120 acres, and devoted his later years to farming.

George W. Norris was a child when the family came to Hancock County and he grew to manhood on the home farm, which he helped to clear. He occasionally found a chance to attend school but not as frequently as he desired, as his services were required at home. On December 21, 1870, he was married to Miss Amanda Baker, a daughter of Alexander and Catherine (Eckert) Baker, old residents of Cass Township. John H. Eckert came to Hancock County from Fairfield County and was the original owner of the farm of Mr. and Mrs. Norris, having made the entry. Mr. and Mrs. Norris have three children: John, who assists his father on the farm of ninety acres, lying in Section 34, on the township line; Belle, who is the wife of D. A. Thomas, who operats Mr. Norris' second farm, and they have three children—Gail, Bernard and Raymond; and George Dallas, who resides at Findlay, married Laura Belle Gibson, and they have one daughter, Pearl.

Mr. Norris has made farming his occupation and has prospered. Oil has been produced on one of his farms. He came to his present one on February 7, 1871 and has made many of the excellent improvements, including the erection of the brick residence which is commodious and attractive.

Mr. Norris has an admirable Civil War record. He enlisted on October 7, 1864, in Co. F, 47th O. Vol. Inf., under Capt. Brachman, and was mustered out in August, 1865. He saw hard service, being under Gen. Sherman in the memorable march to the sea and took part in many serious engagements including Fort McAllister and Bentonville. He was fortunate enough to escape injury and after his honorable discharge returned to Hancock County. He is a member of Stoker Post, No. 54, G. A. R., Findlay, and is also identified with the Odd Fellows there. In politics he is a Republican and for the past twelve years he has been township treasurer. With his wife he belongs to the Methodist Episcopal church.

JOHN H. HILTY,* one of Orange Township's representative business men, the senior partner in the firm of J. H. Hilty & Company, manufacturers of brick and tile, has his plant located on his farm in Section 36, where he owns sixty acres of excellent land. He was born in Richland Township, Allen County, O., March 2, 1848, and is a son of Christian and Madelina (Eicher) Hilty.

Christian Hilty was born at Berne, Switzerland. When he was four years old the family started for America but the mother died on the ocean and was buried at sea. His father continued his journey until he reached Wayne County, O., where Christian Kilty was reared. At the age of twenty-four years he married Madelina Eicher, who was born in Alsace, now a part of Germany, and came to America when eighteen years old. Six children were born to Christian Hilty and his wife, as follows: an infant that died unnamed; Benjamin, who is deceased; John H.; David, who lives in Orange Township; Katherine, now deceased, who was the wife of a Mr. Lugenbihl, of Allen County; and Christian. All the children were born in Richland Township, Allen County, where they settled after marriage, on a farm of eighty acres. There Christian Hilty died in 1872, his burial being in Allen County, three miles northwest of Bluffton. Both he and wife were members of the Swiss Mennonite church.

John H. Hilty was reared and attended school in Richland Township and remained on a farm near Bluffton, in Allen County, for three years following his marriage, when he came to Orange Township, Hancock County. At that time his present farm was practically uncleared. He was enterprising and industrious and soon recognized the fact that this section would prove an admirable location for the brick and tile business. He started into the same at first in partnership with a brother-in-law, one and one-half miles west of his present location. Later he purchased the other interests and took his son into partnership under the firm name of J. H. Hilty & Son, which continued until 1908, when it became J. H. Hilty & Company and its members are: John H. Hilty, Christian Hilty and John Baumgardner. The business has prospered. Formerly about thirty kilns a year were burned but in the present season, up to date, the company has put out about one kiln a week. The product is building brick and tile, in size from three to fifteen inches. The quality of brick and tile compares favorably with that of older and better known plants and its future prospects are very bright.

Mr. Hilty was married in Allen County to Miss Mary Ann Thutt, a daughter of John Thutt, of Richland Township, and six children have been born to them, namely: Christian, who is a member of the above firm, married Minerva Gilbert; Rhoda; Reuben, who resides at Toledo, is a veterinary surgeon; Elmer, a resident of Hancock County, is a civil engineer; Clara, who is the wife of Edward Hansinger, of Martinsburg, Pa., and Elnora, who resides at home. Mr. Hilty and family are members of the Mennonite church. In politics he is a Democrat.

JOHN P. MOSIER, owner of 330 acres of valuable land comprising the old Mosier home farm in Sections 3 and 4, Marion Township, Hancock County, O., and 112 acres lying in Section 23, Cass Township, is numbered with the substantial men of this part of Hancock County. He was born March 24, 1843, in the old log house which his father erected on the farm after he had cleared a space for it, and is a son of Henry M. and Catherine (Davis) Mosier.

Henry M. Mosier was born in Virginia and remained there until reaching manhood when he went to Fairfield County, O., where he soon married Catherine Davis. They had three children: Samuel; Mary, wife of George Wolfe; and John P. After his first wife died he married Catherine Swab, who was born in Pennsylvania and died in February, 1883, at the age of sixty-nine years. They had one child, Cory E., who resides in Marion Township. Henry M. Mosier died in March, 1881, aged seventy-one years. When he came to Hancock County and secured land in Marion Township, it was heavily timbered and it required years of industry to clear and prepare the ground for cultivation. All this work he accomplished, with the assistance of his son, John P., when the latter grew old enough. By trade Henry M. Mosier was a carpenter and builder and numerous structures still standing in Fairfield County, attest his skill. Later he devoted his entire attention to his farm interests and stock raising became an important feature. He was known all over the county, enjoyed a large degree of confidence and frequently served in township offices although he was in no sense a politician.

John P. Mosier had such school advantages as the place and time afforded and he well remembers the old log schoolhouse with its slab seats. He began to help his father when quite young and continued closely associated with him and this interest made the elder desire that this son should remain on the farm. An amicable agreement was reached with the other heirs and Mr. Mosier has continued here. To the homestead he has added his other land as it suited his convenience and he has three sets of buildings, all in good condition. In 1890 he erected his handsome frame residence, giving it a beautiful setting and showing taste in the laying out of the lawn and the placing of shade trees and ornamental shrubbery. In the month of roses one of the bushes in his yard is worth traveling miles to view and enjoy.

Mr. Mosier was married June 13, 1869, to Miss Maria F. Myers, a daughter of S. S. and Ann Myers, both of whom are deceased. Mrs. Mosier was born in Westmoreland County, Pa., May 17, 1845, and her death occurred in 1904. They had six children: Ida May, who died in 1902; Etta Virginia, who married William E. Huffman; William D., who died June 10, 1898; John H., who died June 10, 1897; Cletus L., who died April 26, 1900; and Mertie Blanche, who died September 19, 1903. Mr. and Mrs. Huffman reside with Mr. Mosier and Mr. Huffman operates the farm. He is a son of Norman Huffman. Mr. and Mrs. Huffman have four children: Frances E., Helen M., Donald J. and Pearl M. Mr. Mosier is a Republican and he served on the school board for many years. He has been a member of the Methodist Episcopal church since 1866.

EDWARD BATTLES*, a representative and substantial citizen of Orange Township, Hancock County, O., where he owns 230 acres of land, was born April 7, 1850, in the old log house that was then standing on his father's home farm, which adjoins his on the south. He is a son of Asa and Catherine (Raimers) Battles, and a grandson of Brier Battles.

Asa Battles was born in Pennsylvania, in 1815, and accompanied his father to Trumbull County, O. There he grew to manhood and when he possessed sufficient means, started out as a pioneer himself, purchasing 200 acres of virgin forest in the center of Orange Township, Hancock County. There he built his first log cabin and began the clearing and developing of this land to which he subsequently added until he owned 680 acres, enough to give each of his surviving sons a farm. He was a man of considerable local importance, recognizing his duties in the way of religion and good citizenship and during a long and worthy life retaining the respect of his fellow citizens. He married Catherine Raimers, who was born in Germany but who then lived with her parents in Allen County, O. To them the following children were born: John, Alfred, William, George, Edward, Eliza Jane, Asa, Jesse, Freeman, Robert and Harry. But few of these survive. The two eldest sons died in the army while serving as soldiers in the Civil War. Asa Battles, the father, died in November, 1904, and the mother followed in February, 1909. Their burial was in the Thompson cemetery. Both were valued members of the German Lutheran church.

Edward Battles obtained a district school education and then settled down to farming on the homestead. After his marriage he came to the present farm, next to the one on which he was born. It had not been improved but Mr. Battles erected the present residence, barns and outbuildings, tiled the land and in this way has added largely to its value. He carries on a general line of agriculture and is one of the township's prosperous and independent farmers.

In 1875 Mr. Battles was married to Miss Matilda Pipple, a daughter of William Pipple, of Orange Township, and they have five children: John F., who married Goldie Burns, and has two children—D. and Neva Catherine;

Fairy, who is the wife of Fred Beihl, and resides in Orange Township; Bertha, who married J. C. Wetheral and has one son, Robert; Lewis, who married Ida Kidd, who, at death, left one daughter, Helen; and Harley J. B., who assists his father. Mr. Battles is identified with the Democratic party.

WILLIAM F. SMITH, whose finely improved farm of 130 acres lies in Blanchard Township, Hancock County, Ohio, was born in Hancock County and is a son of Henry William and Albertina (Tagler) Smith.

Henry William Smith and wife were both born in Germany and when they came to America they located first in Hancock County, Ohio, near Fostoria, in Washington Township, where he purchased forty acres of land. This he subsequently sold and moved into Pleasant Township and then to Blanchard Township. During the Civil War he served as a soldier under the call for 100-day men. He died when aged seventy-four years and his wife at the age of sixty-seven years and their burial was at McComb. They were charter members of the Lutheran church at that place. He followed farming through his active years. To Henry William Smith and wife the following children were born: Sarah, who is the wife of George Bach, and resides at Belmore, Ohio; William F.; Louisa, who is the wife of M. C. Warren, of Blanchard Township; George H., who received the home farm and married Della Fry; John W., who married Nancy Fundum; Della, who is the wife of James Warren, of McComb; and Mary, who died in infancy.

After his school days were over, William F. Smith appplied himself to farming. On March 4, 1880, he was married to Miss Theodosia Fundum, a daughter of Henry J. and Katherine (Stone) Fundum, and they have had the following children: Anna Mary, Henry William, Frank Alford, Lulu Alverta, William Jay, and Clarence Ora. The last named died in infancy and was interred at McComb.

Henry J. Fundum, who was a well known resident of Blanchard Township for many years and one of its best citizens, was born in Germany. When he came first to America he settled in Pennsylvania and from there came to Seneca County, Ohio, where he married Katherine Stone, a native of his own birthplace. They settled near Fostoria and remained there until after the birth of two of their children, when they moved to the farm on which William F. Smith and family now live. With the assistance of his brothers, Henry J. Fundum bought this property and later, through purchase, became sole owner and cleared the larger part of it. Subsequently he purchased adjoining land until he owned 400 acres all in one block. This land he divided among his three daughters and their husbands and all of it is improved and well cultivated. Henry J. Fundum lived to be seventy-seven years of age and his wife to be sixty-seven. They were charter members of the Lutheran church at McComb. He was a Democrat in politics, and a member of the local grange. Three daughters were born to Henry J. Fundum and wife, namely: Theodosia, who is the wife of William F. Smith; Amanda, who is the wife of Lewis Brickman, a county commissioner of Hancock County; and Nancy A., who is the wife of John W. Smith. It is the pleasant privilege of all three sisters to live near together and thus to unite with each other in their joys and support each other in their sorrows.

After their marriage, Mr. and Mrs. Smith went to housekeeping on the present farm and here their children were all born. They are members of the Evangelical church in which he is an elder. In politics he is a Democrat and has served as township trustee for two years. He erected all the buildings on his farm, cleared a portion of it and did the draining.

CHARLES DENNIS,* who owns 242 acres of valuable land situated in Blanchard Township, Hancock County, O., was born in Eagle Township, Hancock County, February 2, 1865, and is a son of Samuel and Matilda (Alspath) Dennis.

Samuel Dennis was born in Pennsylvania and died at Rawson, O., at the age of eighty-two years, being buried in Benton Ridge cemetery. In early manhood he came to Fairfield County, O., where he married Matilda Alspath and engaged in farming there. Three sons were born to them in the same house in which Mrs. Dennis was born. They moved then to Hancock County and five more sons were born in Eagle Township, and one more in Blanchard Township. Samuel Dennis traded farms with John Smith and after he took possession of the Blanchard Township farm he built the present farm residence, which has needed but a small amount of repairing since. Samuel Dennis lived at McComb for two years and then moved to Rawson. He was a Democrat. After his death his widow came to make her home with her son Charles. She is a member of the Church of God, but her husband belonged to the Methodist denomination.

Charles Dennis went to school in Blanchard Township and then worked for his father until he was about twenty-two years of age, when he married and since then has operated the farm for himself. He is very successful in his undertakings and is one of the most enterprising and hard working farmers of this neighborhood.

Mr. Dennis married Miss Emma Ritter, a daughter of W. C. Ritter, and they have three children, Ethel, Leo and Herman. In politics he is nominally a Democrat but has independent leanings and very often exercises his own judgment only in casting his vote. For seven years he has served as a member of the township school board. He belongs to the order of Knights of Pythias, attending the lodge at Findlay.

HARVEY H. WELLS,* who, for fifty years has been a resident of Hancock County, O., owns a valuable farm of 120 acres which lies in Pleasant Township, which he devotes to general farming and stock raising. He was born in Licking County, O., and is a son of Noah and Edith (Warner) Wells.

Noah Wells was born in Arundel County, Md., a son of Richard Wells who came to Licking County, O., at an early date and died there. Noah Wells grew to manhood and married in Licking County and came from there to Hancock County during the War of the Rebellion and settled in Pleasant Township, on the Ridge road, one mile west of Deweyville. He purchased and improved forty acres of land. In later years he removed to Paulding County, O., where both he and wife died. Six sons and six daughters were born to Noah and Edith Wells, namely: Calvin, who served in the Civil War, enlisting at Newark, O., and died in the service from typhoid fever; Ann, who married Joseph Simmons in Licking County, moved first west of Deweyville and later to Missouri, where both died; David, who died of typhoid fever while serving as a soldier in the Civil

War; Mary, who married Rutherford Adams, and resides at Croton, Licking County; Millie, who married Bazil Sparling, of Hancock County, survives him and resides at Toledo; James, who resides at Benton Ridge; Amanda, who is the wife of Myron Moore, and resides in Henry County; Nelson, who resides in Putnam County; Harvey H.; Emma, who lives in Putnam County, is the widow of R. C. Dillon, who died in May, 1910; and two that died in infancy.

Harvey H. Wells attended the township schools as opportunity offered in his boyhood and then worked on the home farm until he married. For sixteen years afterward he worked as a farmer for Lewis Dukes, of Blanchard Township. He had no capital to begin with and every dollar he has invested he has earned by his own persevering industry. His first purchase of land was forty acres in Putnam County and later he bought 106 acres of Amelia Austin but sold over twenty-six of them and then continued to cultivate about eighty acres until in March, 1907, when he sold this land to advantage. He then purchased what was locally known as the Francis Hull farm, his present property. This land was originally entered by James Ewing in the early days of the county and it later passed into the hands of a Mr. Orrick who subsequently sold it to Francis Hull. Mr. Wells lost his house by fire in 1909 which necessitated the building of a new one. His fine barn is one of the best structures of its kind in the township.

In the spring of 1880, Mr. Wells was married to Miss Sidney Ellen Riggle, a daughter of John and Mary (Goodwin) Riggle, and they have three sons and one daughter, namely: Claud, who resides in Liberty Township and is a worker in the oil fields, married Pearl Smith and they have four children—Ralph, Orville, Evelyn and an infant; Lettie May, who is the wife of Roy Rader, of McComb, has two children—Dorothy and Catherine; and Clarence and Orie, both of whom give their father assistance on the farm. Mr. Wells and family are members of the Church of Christ at McComb. In politics he is a Republican but is no seeker after political rewards. He is one of the representative and worthy citizens of this section of Hancock County.

ELI ALEXANDER,* vice president of the Buckeye Ice and Coal Company, and foreman of the block department of the Findlay Clay Pot Company, has been a resident of Findlay, Ohio, since 1887. He was born December 15, 1862, on a farm in Richland County, Ohio, a son of George and Sarah (Hersch) Alexander. The father of our subject died in the fall of 1890 in Dickinson County, Kansas, where he located with his family in 1880. The mother is still living in Kansas.

Eli Alexander was reared on the home farm and in 1880 went with his parents to Kansas, where he learned the carpenter's trade. In 1887 he returned to Findlay, Ohio, where he worked for a time at his trade and in 1889 became a mold maker in the Findlay Clay Pot Company, with which he has since been identified. He is now one of the directors of that concern, and is foreman of the block department of same. For the past 14 years he has been identified with the Buckeye Ice and Coal Company, of which he is now vice president. Mr. Alexander is politically a Democrat, has served two years on the City Council, and was a member of the Board of Water Works at the time the new water system was installed. He is fraternally a member of the Masonic order.

C. L. CASTERLINE

Mr. Alexander was united in marriage with Elizabeth J. Stoker, a daughter of T. A. Stoker, who is a prominent farmer of Allen Township, Hancock County, Ohio. The following children have been born to Mr. and Mrs. Alexander: Jennie, Eve, George, Ruth, Isabelle, Harold and Dora. The family reside at No. 2512 North Main Street.

CYRUS L. CASTERLINE,* vice president of the American National Bank at Findlay, Ohio, proprietor of the Bradford Oil Company and secretary and treasurer of the Genesee Oil Company, has been one of Findlay's enterprising and successful business men for a number of years. He was born in 1851, at Angelica, Alleghany County, New York.

Mr. Casterline was educated in his native place and first became identified with the oil industry when he went to the Bradford oil fields, in 1876. He became a partner of the late C. S. Carthell in the Bradford Oil Company and after Mr. Carthell's death purchased the business and has continued as its sole proprietor. As secretary and treasurer of the Genesee Oil Company, of Findlay, he occupies a prominent position in the commercial life of the city, while other business enterprises in which he is officially interested, have still further increased his influence. His worth as a progressive and public-spirited citizen has been recognized in many ways and he has served with efficiency in civic offices, especially as a member of the city board of improvements.

In politics, Mr. Casterline is a Republican, but his business interests have always been so large that he has found little time to entertain political aspirations. He has a very beautiful home on South Main Street, although a bachelor, and in his elegantly fitted apartments may be found many articles of more than usual interest, notably a collection of horns which is probably the most complete in the state and one pair, elaborately carved, would grace any museum. He is a 32nd degree Mason and a Shriner and belongs also to the Elks and the Knights of Pythias. He is a man of generous impulses and his donations to charity are large although very quietly made.

ALPHEUS HOFMASTER,* who is engaged in general farming on a tract of 100 acres in Section 24, Washington Township, Hancock County, Ohio, has been a life long resident of the county. He was born December 28, 1856, on the old Jacobs farm in Washington Township, and is a son of Jonas and Mary (Jacobs) Hofmaster.

John and Rachel (Eadler) Hofmaster, paternal grandparents of our subject, were natives of Germany and were among the early settlers of Mahoning County, Ohio. They subsequently came to Hancock County and located on what is now known as the William Earnest farm in Washington Township. Here they spent the remainder of their lives, his death occurring at the age of 91 years; his wife died at the age of 86 years. They were the parents of the following children: Paul, deceased; Catherine, deceased; Anna, deceased; Jonas, deceased; Rachel, deceased; Mary, who is the wife of Isaac Hooper; Ellen, deceased; Lydia; Jacob, deceased; Hannah; and three who died in infancy.

Jonas Hofmaster was born August 13, 1829, in Mahoning County, Ohio, and when a young man came to Hancock County with his parents, who settled on a tract of timberland in Washington Township. He was married to Mary Jacobs, who was born in Hancock County, Ohio, and was a daughter of John and Margaret Jacobs, natives of Germany, who came to Hancock County in 1833 and entered land one mile north of our subject's place in Washington Township. After his marriage Jonas Hofmaster spent ten years on the old Jacobs farm, then bought 80 acres of land from Nick Jacobs, to which he later added 20 acres, the farm now being owned by our subject, Alpheus Hofmaster. The land was partly cleared and there was an old log house on the place, but it was later replaced by the house which is now on the farm. Jonas died on this farm January 2, 1904, and was survived by his widow until February 22, 1907, who was 73 years old at the time of her death. They were parents of the following children: Alpheus; Alice Elizabeth, deceased wife of Clarence Stewart of Michigan; Celestia, who married Dr. N. C. Miller of Fostoria, Ohio; Margaret, the wife of Miron Smith, of Fostoria; Ella, who died young; and two who died in infancy.

Alpheus Hofmaster was reared on his present farm, having been just a boy when his parents removed from the old Jacobs farm, where he was born. He attended the district schools of the township, but being the eldest child was obliged to devote considerable time to the farm work, and after his marriage, continued to live here, buying the farm from the Hofmaster heirs. He has remodeled the barn, erected milk-houses and otherwise made many improvements, and in connection with general farming is extensively engaged in shipping cream to Indiana.

Mr. Hofmaster was married November 22, 1887, to Jennie Brown, who is a daughter of Alexander and Mary (Pughe) Brown, the latter of whom is deceased, and they have two children: Harry, and Mary. Mr. Hofmaster is one of the public spirited and enterprising citizens of the township and in politics is identified with the Democratic party.

A. C. DICUS,* manager of the Farmers' Elevator and Exchange Company, at Mt. Cory, Hancock County, O., an enterprising and progressive business man, was born June 10, 1850, at Wabash, Ind., and is a son of Burgess and Hannah (Connell) Dicus. The father was born in Maryland, later moved to a farm in Fairfield County, O., and died at Defiance, in 1869, aged fifty-seven years. The mother was born and reared in Pennsylvania and died at Defiance, O., in 1884, aged seventy-two years.

A. C. Dicus was six years old when his parents moved to Illinois, where the family remained on a farm for ten years and then returned to Ohio and located at Defiance. In that city Mr. Dicus obtained a public school education. Following his marriage he established his home at Mt. Blanchard and five years since came to Rawson, where he has invested in property. The Farmers' Elevator and Exchange Company at Mt. Cory has become an enterprise of large importance to the farmers of this section. It was incorporated in 1907. The company deals in grain of all kinds, wool, coal, tile and flour. Mr. Dicus has the entire management of the business.

In 1883 Mr. Dicus was married to Miss L. A. Switzer, of Findlay, who was born and reared in Hancock County. They have four children: Glenn, who married Maud Huntward, of Benton Ridge; Anna, who married Grover Fox, of Rawson; S. E., and Harold.

HOMER L. TAYLOR,* who is engaged in general farming on a tract of 160 acres, located about one and a quarter miles east of Van

Buren in Allen Township, Hancock County, Ohio, was born October 24, 1861, on his farm on which he now lives, and is a son of Charles and Caroline (Fairchilds) Taylor.

Charles Taylor was born in Bedford County, Pa., and in early manhood came to Ohio, and worked at cabinet making in various places. After his marriage with Caroline Fairchilds, he resided several years in Van Buren, Hancock County, Ohio, but later settled on the farm in Allen Township, which our subject now owns. This he partly cleared and placed in a state of cultivation, and spent the remainder of his life here engaged in agricultural pursuits. The parents of our subject were the parents of twelve children, ten of whom are still living, our subject being the youngest of seven sons.

Homer L. Taylor was reared on his present farm, attended the local schools, and in early manhood learned carpentering, which he followed some years. In 1894 he purchased the home farm from the heirs, and has since carried on general farming and stock raising, and is one of the most prosperous farmers of Allen Township.

Mr. Taylor was married to Madge Showman, who was born and reared in Allen Township, and is a daughter of Pembroke B. and Caroline (Heller) Showman. Pembroke B. Showman was a native of Maryland, and in 1849, during the gold excitement, spent some time in California, but subsequently came to Hancock County, Ohio, where he had a brother living. Here he married Caroline Heller, who was born and reared in Hancock County, and spent the remainder of his life on a farm in Allen Township, where his death occurred in 1901. He is still survived by his widow. Six children have been born to Mr. and Mrs. Taylor, namely: Charles Pembroke; Clyde LeRoy; Sarah Caroline, Edmund Showman; Donald William; and James M. The family holds membership with the Van Buren Presbyterian Church. Mr. Taylor is a director of the schools of District 6 of Allen Township.

CHARLES A. KELLEY,* owner of a valuable farm of eighty acres, situated in Section 3, Portage Township, Hancock County, O., eleven miles northwest of Findlay, was born in Gratiot County, Mich., August 17, 1869, and is a son of Alvin C. and Sarah A. (Patten) Kelley. When he was about three months old the family moved to Washington Township, Hancock County, O., where the father bought a farm. Later he retired to Bloomdale, in Wood County, where he still resides, his wife having died there in 1900.

Charles A. Kelley was the third in his parents' family of four children, the others being as follows: Edwin H., who died in Washington Township—was a farmer and a teacher and later engaged in the practice of law in the city of Cleveland; Lettie, who is the wife of A. E. Hale, of Findlay; and Louie, who is the wife of James F. Ernest. Mr. Kelley has been engaged in general farming ever since his school days. He came to his present place in 1898 and has made many improvements along sensible, practical lines and these have materially added to the value of his property.

Mr. Kelley married Miss Emma M. Hale, a daughter of Taylor and Zeruah Hale, of Wood County, O., and they have four children: Lynn H., Curtis E., Claire and Charles. They are being given many advantages and give promise of growing into admirable maturity. Mr. Kelley and family belong to the Methodist Episcopal church of North Baltimore, of which he is a trustee. He is an enterprising and interested citizen of his township and has served on its school board.

H. J. RUTLEDGE,* manager of the Buckeye Ice and Coal Company, at Findlay, O., and a representative business man of this city, was born in Fairfield County, O., February 10, 1855, and is a son of Abraham and Nancy Ann (Hughes) Rutledge.

Abraham Rutledge was born in West Virginia and remained there until he reached manhood, when he came to Fairfield County and some years later to Putnam County, where he lived from 1858 until 1861. He then came to Hancock County and located on a farm in Union Township, where his death occurred, in 1873, at the age of sixty years. His burial was in the Clymer Cemetery, in that township. His widow survived until 1889, dying at Findlay. She was born, reared and educated in Fairfield County. Both were members of the United Brethren church and were worthy Christian people in every sense of the word.

H. J. Rutledge was four years old when his parents moved to Putnam County but he obtained the greater part of his schooling in Union Township, Hancock County. He was married first in 1885, to Miss Philena Altman, who died at Mt. Cory, in 1892, aged thirty-two years. Her parents were Jacob and Ellen Altman, and her father was a farmer in Union Township. Mr. Rutledge was married secondly to Miss Louise M. Storel, a daughter of Gotleib and Mary Storel, who were farming people in Hardin County, O. In 1892 Mr. Rutledge moved from Mt. Cory to Findlay, where he and his wife enjoy one of the finest homes in the city, located at No. 315 East Center Street. They are members of the First Methodist Episcopal church at Findlay. Mr. Rutledge has been manager of the Buckeye Ice and Coal Company since its incorporation in 1909.

DAVID EDSON PEPPLE,* whose valuable farm of 160 acres is situated in Section 23, Cass Township, Hancock County, O., is one of the representative business men of this section. He was born on his present farm, May 13, 1861, and is a son of John and Mary (Groner) Pepple and a grandson of Simon Pepple.

John Pepple grew to manhood in Columbiana County, O., a son of Simon Pepple, who was a native of Pennsylvania. In Columbiana County, John Pepple was married to Mary Groner, whose people had also come from Pennsylvania, and after the birth of their first child, John Pepple and wife moved to Hancock County, settling in the woods, their tract being now included in the present farm. The wife had inherited sixty-six acres from her father and later John Pepple added the remainder until the aggregate was 173 acres. Their first house was the usual pioneer affair, made of logs, but as the land became cleared and cultivated and grew profitable, a better one was erected and their last years were spent in great comfort. Her death occurred in 1891, at the age of sixty-six years, while his followed, in 1897, when he was aged seventy-eight years. They had the following children: Samuel, who lives in Minnesota; Reuben G., who lives in Michigan; Elias W., who lives in Cass Township; Lucinda E., deceased, who was the wife of E. Powell, of Hancock County; Simon, who is deceased; John W., who is also deceased; Mary Ellen, who is the wife of C. Sherman, of Hancock County; and David Edson.

David Edson Pepple may be said to have

CHARLES E. JORDAN

spent his whole life in Cass Township, the only time excepted being his twenty-first summer which he passed with a brother in the West. He attended the district schools and then turned his attention to agricultural pursuits, and later came into possession of the home farm through purchase. He carries on general farming and raises stock for his own use. He is a stockholder in and was one of the organizers of the Arcadia Bank and Savings Company, at Arcadia, O.

On September 1, 1887, Mr. Pepple was married to Miss Ella M. Burman, a daughter of Henry and Susan Burman, of Van Buren, O., and they have one son, Clyde E. This young man, who is a member of the class of 1911 at Delaware College, has made a fine record both for punctuality and scholarship ever since he began attending school. Mr. Pepple and family are members of the Methodist Episcopal church at Arcadia. He is identified with the Masons, the Odd Fellows, the Knights of Pythias and the D. O. K. K., belonging to organizations at Findlay, Toledo and Arcadia.

CHARLES E. JORDAN, president of The Findlay Courier Company of Findlay, Ohio, and vice president of the City Banking Company, is a representative member of the Findlay bar. He was born in Washington Township, Hancock County, Ohio, December 27, 1870, and is a son of John M. and Isabel (Redman) Jordan.

John M. Jordan was born on the old home farm in Washington Township, where he died in May, 1881. His father, Charles E. Jordan, an early settler, had come to this place from Belmont County, Ohio. John M. Jordan served as a soldier in the Civil War but survived its dangers and died many years afterward after years of peaceful pursuits. He married Isabel Redman, who was also born in Washington Township and died in August, 1881, on the home farm.

Charles E. Jordan, bearing his grandfather's name, was reared on the old family estate and from the country schools entered the Northwestern Ohio Normal University at Ada and after completing the literary course entered upon the study of law. He was graduated from the law department of the Cincinnati College, and was but twenty-two years of age when he was admitted to the bar, in 1893. For six years Mr. Jordan acceptably filled the difficult office of prosecuting attorney for Hancock County, being elected on the Democratic ticket in 1896, and since then has devoted himself to a private practice that is more or less absorbing.

Mr. Jordan was married to Miss Gail Dukes, a member of one of the old and prominent county families. They have one son, Richard D. The father of Mrs. Jordan was Eli Dukes, a prominent resident of Blanchard Township. Mr. Jordan served as clerk of the police court under Mayor Meehan's administration. He is a member of the Masons, the Knights of Pythias and the Elks.

JAMES O. LINE,* whose fine farm of 160 acres is situated in Eagle Township, Hancock County, Ohio, about seven miles south of Findlay and three-fourths of a mile west of the Bellefontaine road, in Section 24, has always resided on this place and was born here June 28, 1875. His parents were Elijah C. and Julia A. (Elsea) Line.

Elijah C. Line came with his wife to Eagle Township in their early married life and he was engaged in farming on this land through all his active years. His death occurred here in 1887, his widow surviving until 1891.

James O. Line grew to manhood on the present farm and obtained his education in the local schools. From early youth he assisted his father and since coming into possession of the property he has made many substantial improvements. He carries on general farming and stock-raising and makes the growing of sheep a specialty. In the fall of 1897 he started to housekeeping on the present place, following his marriage, and his five children have been born here, their names being respectively: Everett, Leroy, Mervin, Thelma and Gerald. In the spring of 1908 Mr. Line began to enjoy the postal free delivery system. He is a well informed man and is particularly well posted along agricultural lines and as he makes a practical application of his knowledge he is very successful.

MARTIN L. WISELY,* secretary of the Buckeye Ice & Coal Company, successors to the Peoples' Ice & Coal Company of Findlay, Ohio, was born December 24, 1871, on a farm six miles east of Findlay, Ohio, and is a son of William P. and Catherine L. Wisely.

William P. Wisely, deceased, was formerly known throughout Hancock County as one of its most successful agriculturists, and was a son of Allen and Amelia (Bright) Wisely. His father was one of the first five settlers of the county, coming here in 1831 with a party of five pioneers and helping to survey the county when it was still in a state of primeval wilderness. Seeing that this region had a promising future, Allen Wisely invested in a large tract of land, and spent the remainder of his life in placing it in a state of cultivation. At the time of his death in 1888 he left a fine estate of three thousand acres, most of which had been improved by his long and arduous labors. He was the father of eight children, those surviving being as follows: Mrs. Sarah Davis, Mrs. America Glick, Loraine, and Daniel S. Wisely.

William P. Wisely, father of our subject, was trained to agricultural pursuits, and like his father became a successful farmer, leaving at the time of his death, in middle life, one of the finest landed estates in Hancock County. He was a member of the United Brethren church.

Martin L. Wisely was less than four years of age when his parents died and he was reared by his grandmother, who lived near Jackson, Mich. At the age of 16 he returned to Findlay, Ohio, where he entered college, but shortly after went to California for his health. He spent one year on a ranch there, sleeping out of doors every night and returned to Findlay greatly improved in health. He followed farming on the home place five years and in 1901, with his brother William P. Wisely, embarked in the ice and coal business at Findlay, the firm being known as the Peoples' Ice & Coal Company. October 1, 1909, the Buckeye Ice & Coal Company was organized and incorporated with a capital stock of $20,000, and the following officers elected, W. S. Parker, president, Eli Alexander, vice president, H. J. Rutledge, manager, M. L. Wisely, secretary and Charles E. Jordan, treasurer. The Buckeye Ice & Coal Company, whose offices are located at No. 329 North Cory Street, carry on a retail and wholesale business and employ from twelve to fifteen men. They also own at Riverside Park an ice-house which has a capacity of 10,000 tons.

Martin L. Wisely was joined in marriage witb Clara L. Adams, a daughter of Philip

Adams, and to them have been born two children: Charles M., and Bernice M. Mr. Wisely is politically a Republican and served four years—beginning in 1897—as trustee of Marion Township.

William P. Wisely, brother of our subject, was born September 5, 1873, and graduated with the class of 1891 from the Findlay College. He is one of the prominent and substantial business men of Findlay, and is fraternally identified with the Elks and the Masons, in the latter of which order he has attained the 32nd degree. He married Bessie B. McLeod, a daughter of the late Dr. Joseph R. McLeod, who was one of the oldest and best known physicians of Findlay.

ROBERT I. MACKEY,* a leading citizen of Pleasant Township, Hancock County, O., who carries on general farming on over 200 acres of land, including his own and other properties, is a member of one of the old and honorable county families. He was born in 1850, three miles west and one-half mile south of McComb, Hancock County, and is a son of William and Lavina (McVay) Mackey.

William Mackey was born in Jefferson County, O., where his father had settled when he came from Ireland. For many years he carried on farming in Hancock County, having moved to Pleasant Township in 1845. He was married in Pennsylvania to Lavina McVay, who was born in Highland County, O. Both died on the home farm many years later, the mother in 1902 and the father in 1909, the latter being in his eighty-fourth year. Their children were: Robert I.; Maggie, who is the widow of Frank Van Dyke; Maroa, who is the wife of Harland Stoker, of McComb; Frank, who is part owner of and lives on the home farm; Eliza, who resides at Buffalo; and Wallace, who lives at McComb, O. The parents of the above family were members of the Presbyterian church at McComb, the father being an elder in the same. He was a Republican in his political views.

Robert I. Mackey was reared on the home farm and obtained his early education in what was known as the Bail's schoolhouse, in Pleasant Township. His interests have been mainly agricultural and since 1872 he has resided on his present farm of fifty acres, near Deweyville, land which was formerly owned by his father but was purchased by Mr. Mackey in the above year. It is in a fine state of cultivation and with the exception of ten acres, was all cleared and ditched by Mr. Mackey since coming here. In addition to cultivating this property, he also operates a part of the Goudy farm, and also tracts for E. E. and Charles Ewing, aggregating more than 200 acres. He is an enterprising and progressive farmer and all this land is made to return generously for the care and attention bestowed on it.

Mr. Mackey was married in 1872, to Miss Elizabeth Mowery, of an old Pleasant Township family, and they have one daughter, Mary, who is the wife of Sumner Downing. Mr. Downing is a successful business man of Benton Ridge. They have one son, Marcus. Mr. Mackey is a Republican but has never sought any political preferment. He has always taken an active interest in the public schools, partly on account of his father's long connection with them, he having taught for thirty-three successive terms. Mr. Mackey is one of the oldest continuous residents of this part of Pleasant Township.

WILLIAM F. DUNCAN, judge of the court of common pleas of this district, was born at Cardington, Morrow County, Ohio, February 13, 1864, the eldest of seven children of Hon. Thomas E. and Rachel (Frew) Duncan. He was educated in the public schools of the county, graduating from the Mt. Gilead High School in 1883. As a school boy he spent his vacations working on the farm and upon leaving school took a place in his father's flouring mill for about eighteen months as the "all around" man where he learned the first ethics of business and something about machinery. He afterwards supplemented his education by a year each in Dennison and Ohio Wesleyan universities.

In 1886 he began the study of law with his father, Judge Thomas E. Duncan, at Mt. Gilead, and the next year entered the senior class of the Cincinnati Law School where he graduated in May, 1888, and was admitted to the bar, from which time he practiced with his father at Mt. Gilead to the first day of January, 1889, when he came to Findlay, his present home. Here he acquired some little reputation as a lawyer and a good clientage.

In 1890 he was elected city solicitor of his city and in 1892 reelected. In this office he proved himself capable and worthy and laid the foundation for future honors. In September, 1902, he was appointed by Governor Nash to fill out the unexpired term of about eight months on the common pleas bench of this district, caused by the resignation of Hon. J. W. Schaufelberger of Tiffin, which he did faithfully and well and returned to his law practice. In November, 1903, he was elected to another vacancy on this bench, caused by the death of Hon. Charles M. Melhorn of Kenton. The next year he was elected to a full term, which he is now serving. On the bench he has also "made good" and his administration of the office has given general satisfaction. At this writing he has been nominated and is a candidate for another term.

Judge Duncan in public as well as in private life, has proven honest, able and faithful and has treated all with courtesy and respect, and he, in turn, enjoys the confidence and respect of the bench and bar of his district and the people generally.

On May 5, 1891, Judge Duncan was married to Miss Elba Nile Ireland, daughter of Alexander and Mary Ireland, prosperous farmers of Morrow County, of Scotch-Irish descent, like the Duncans. They reside at 506 West Sanduskey street. Mrs. Duncan is a member of the Methodist Episcopal Church and is active in its benevolent work. Judge Duncan is a Republican in politics and is identified with several leading fraternal societies.

COL. JAMES FINDLAY was born in Franklin County, Pennsylvania, in 1770. His parents were Samuel and Jane (Smith) Findlay, who reared a family of six sons—John, William, James, Jonathan, Thomas and Nathan—all of whom became prominent and distinguished men. In politics they were Democrats, and held office of distinction under that party, but in after years James became a Whig. He married Miss Jane Irwin, and about 1795 moved to Ohio, traveling on horseback by way of Virginia and Kentucky, and settling in Cincinnati, then a small village. Here for a number of years he filled the position of receiver of public moneys in the land office. In 1805-6 he served as mayor of Cincinnati, and again in 1810-11. When the War of 1812 broke out he was commissioned as

WILLIAM F. DUNCAN

colonel of a regiment, which was the advance guard of General William Hull's army on its march from the Scioto River to the Maumee. On this march he began the erection of Fort Findlay, named in his honor, and from which the city of Findlay derives its name. For meritorious conduct in the War of 1812 Colonel Findlay was afterwards promoted to the rank of brigadier-general of the state militia, in which capacity he served for a considerable period. Colonel Findlay was the member of congress from Hamilton County from 1825 to 1833. In 1834 he was the Whig and Anti-Masonic candidate for governor of Ohio, but was defeated by Robert Lucas, and died in the following year. Naturally reserved in his manner, he presented to strangers an air of austerity; but to those who knew him he was the soul of kindness and geniality. Colonel Findlay possessed great decision of character, was just in all his dealings, and maintained through life an unsullied reputation.

JACOB H. BOGER, D. D. S., who is a leading practitioner of dentistry and a prominent citizen of Findlay, Ohio, having served as postmaster, was born in Harrisburg, Penn., June 27, 1859, a son of John A. and Mary A. (Kuhnle) Boger. His parents were both of German stock, though John A. Boger, the father, was born in Pennsylvania and now resides in the city of Philadelphia, where he is well known as one of the local leaders of the Republican party and holds a responsible position in the comptroller's office. He has been a resident of that city since about 1869. He and his wife reared a family of seven children, of whom there are now six survivors. His wife's grandfather on the maternal side, Samuel Skeen, was a lieutenant in the Philadelphia County (Penn.) militia in the early days.

The subject of this sketch, Jacob Henry Boger, began his literary education in the schools of his native city, and afterward continued it in those of Philadelphia, to which place he accompanied his parents at the age of ten years. In 1877 he began the study of dentistry in the office of Dr. J. F. Fryer, of Pottstown, Penn., a very skilful practitioner. Under Dr. Fryer's direction he familiarized himself with all the various methods of dental science, in both the operative and laboratory departments, after which, in order to obtain the most thorough preparation for the practice of his chosen profession, he matriculated at the Pennsylvania College of Dental Surgery, Philadelphia, where he was graduated in 1880 with the degree of Doctor of Dental Surgery and with class honors.

Beginning the practice of dentistry in Findlay in March of the same year, he has since continued his professional labors in this city, having gained a high reputation for skilful and conscientious work. His office in the Adams Building, Main Street, is equipped with the most approved mechanical appliances made use of in his profession and he enjoys a large and select patronage.

Dr. Boger has also been quite active in promoting the growth and development of his adopted city, dealing extensively in real estate, which he has found a profitable source of income.

The Doctor is a stanch supporter of the Republican party and for a number of years has been quite active in county politics, having rendered valuable services to his party. He was formerly for seven consecutive years a member of the Board of Election Supervisors of Hancock County, rendering very efficient service in that capacity. In 1884 he was elected to the office of city clerk of Findlay, which he filled capably for four years. In 1887 he assisted in the formation of the National League of Republican Clubs at New York City. Four years he was a delegate to the State Convention when Major William McKinley was nominated by acclamation and he afterwards strongly supported that distinguished statesman for the presidency. In 1898 he was chairman of the Congressional Committee of the Eighth District, having previously served as a member of the Executive Committee of Ohio from Hancock County.

Dr. Boger's exertions on behalf of his party were acknowledged by his appointment, June 22, 1898, by Pres. McKinley, to the office of postmaster of Findlay, which met with the general approval of the citizens. He subsequently justified the selection by the able manner in which he administered the affairs of the office. His administration was continued through two terms, as he was reappointed by President Roosevelt, June 27, 1902.

Dr. Boger is a prominent Free Mason, having attained the thirty-second degree of the Scottish Rite and being also a noble of the Mystic Shrine. He is past eminent commander of Findlay Commandery, No. 49, Knights Templar. He is also a member of the Royal Arcanum and the Knights of Pythias. His professional associations include membership in the Ohio State Dental Association, the Dentists' Protective Association, and President Hancock County Dental Society.

Dr. Boger was married, on December 6, 1882, to Miss Jennie Mungen, a daughter of Hon. William Mungen, who was the only Democratic representative ever sent from Hancock County to Congress, and who was one of the most esteemed residents of Findlay. Dr. and Mrs. Boger are the parents of one child, Corinne. The family residence is at No. 1131 S. Main Street.

It will be seen, even from this brief sketch, that its subject is one who may well be classed among the leading and representative citizens of Hancock County—representative of Twentieth Century progress and initiative. Most professional men are content to attain a respectable standing in their profession and remain simple doctors or lawyers throughout their entire individual careers, but Dr. Boger, in seeking an outlet for his superfluous energy, has demonstrated that it is possible to render high service and gather honors on more than one field of activity, and that without losing ground in any direction or neglecting any personal duties. As the Doctor has hardly yet passed the meridian of life, it is but fair to assume that the future has in store for him still greater successes than those he has already achieved, for he is not one of those who can rest on their oars and carelessly drift down life's stream to the great ocean of Futurity, but one, rather, who seizing the oars in vigorous grasp propels his stout craft firmly and swiftly towards a definite goal—the harbor of Worthy Ambitions Honorably Attained.

ELIJAH P. JONES, formerly president of the First National Bank at Findlay, O., of which he was one of the incorporators, for many years was prominently identified with Findlay enterprises, having settled in this town after years of business success in other places. He was born at Rochester, N. Y., in the year 1820, and died in his beautiful home at Findlay, July 19, 1894, being laid to rest in the peaceful quiet of Maple Grove Cemetery.

Mr. Jones came of New England ancestry and was of Revolutionary stock. His father, Elijah Jones, was a native of Connecticut, who removed to Pennsylvania for a time and was there interested in the lumber business. Later, however, the elder Jones located at Rochester, N. Y., where he was engaged in mercantile and other lines of business activity. In 1820—the year of the birth of our subject—he removed to Lake County, Ohio, and there in all probability his busy life closed.

Elijah P. Jones was evidently a youth of quick intelligence, for he was teaching a district school when only sixteen years of age. At the age of eighteen he accepted a position as clerk in the Cleveland post office, where he remained for three years, after which he attended Norwalk Academy, completing the course. For one year thereafter he served as agent of what was then the Sandusky and Mansfield Railroad (now a part of the Baltimore & Ohio system), and later he was agent for the Mad River & Lake Erie Line, now the Cleveland, Cincinnati, Chicago & St. Louis Railroad. The discovery of gold in California at this time greatly stimulated railroad construction, and when the Carey & Findlay Railroad was completed, Mr. Jones leased the same for two and a half years, renewing the lease on its expiration, and operating the line for about eight years.

In 1852, with his brother, George Jones, and E. N. Cook, he went to Salem, Oregon—a move evincing characteristic business foresight—and for four years the partners did a large and prosperous business in general merchandising. In the end, however, the scheme failed, but from no want of judgment in its originators. The Indians suddenly became hostile in the west and the troops quickly gathered to subdue them, not being provided with stores, seized whatever necessary supplies they could lay hold of, this entailing a loss upon Mr. Jones and his firm of some $60,000.

Dissolving partnership in 1857, Mr. Jones returned east, and became first a broker and then a banker, conducting business in New York City and later at Findlay, to which city he came in 1859, When the First National Bank of Findlay was organized, in 1863, he became its president and subsequently continued in that office until his death. He became a man of very large estate, acquiring property in various localities and ably managing his many affairs to the end of his active life. Of varied experience and possessing an enlightened mind, he was well qualified for the political arena, had his ambition led him in that direction. His vote was cast with the Republican party, after its formation. In religious faith he was a Presbyterian. His charities were many, and the results of his benevolence have done much to relieve human suffering in Findlay to which city he was very loyal after making it his home.

Mr. Jones was married January 15, 1861, to Miss Mellie E. Johnston, a daughter of John S., and a granddaughter of William Johnston, her family being an old and prominent one of Piqua, Ohio. She was graduated from the Wesleyan Seminary at Delaware, Ohio, in 1860. Three children were born of this marriage, namely: Cornelia Frances, Mary Gertrude, and George Pelton. Both daughters are now deceased, Cornelia Frances passing away in 1903 and Mary Gertrude in 1891. The latter was the wife of William T. Ward. Both were ladies of high social standing in Findlay and both were graduates of Vassar College. Mrs. Jones still occupies her beautiful home, which is situated at No. 313 So. Sandusky Street.

WILLIS M. METZLER, M. D., who has been engaged in the practice of medicine at Vanlue, Hancock County, O., for the past fourteen years and is professionally valued all through this section, was born in Liberty Township, Hancock County, September 21, 1866, and is a son of Henry H. and Caroline (Reed) Metzler.

Henry H. Metzler was born in Columbiana County, O., a son of Jacob Metzler, who was a native of Pennsylvania. In 1850, Henry H. Metzler moved to Hancock County. His father Jacob bought a farm in Liberty Township on which he resided until 1865. Henry H. Metzler died in 1892, at the age of fifty-one years. He married Caroline Reed, a native of Hancock County, who died in 1899, aged fifty-seven years. To them were born the following children: Willis M., J. Reed, Harriet, Samuel, Blanche, Mary and Bessie.

Willis M. Metzler attended the township schools in boyhood and later the Findlay schools and graduated from the Findlay High School before entering upon the study of medicine, with a Findlay physician. He also officiated for a time as a clerk in the Findlay post office. After a year of preparation he entered Starling Medical College, at Columbus, where he was graduated in 1895, and in the following year opened his office at Vanlue and enjoys a large and substantial practice. He is identified with the leading medical organizations, including the Hancock County, the Ohio State and the American Medical Associations.

In 1902 Dr. Metzler was married to Miss Lola Cross, of Amanda Township, Hancock County. They are members of the United Brethren church. Dr. Metzler has been a very active and useful citizen. He served one term as township treasurer, one term as town treasurer, and is village treasurer and treasurer of the school board at present. In his political views he is a Republican and fraternally he is a Mason and K. P.

DARIUS W. YATES, who is a general farmer in Jackson Township, Hancock County, Ohio, where he owns sixty-eight acres of fine land, was born in Jackson Township, May 11, 1886, and is a son of Newton and Samantha (Cooper) Yates.

Newton Yates was born in Hancock County, to which his father came at an early day, and for many years he has resided in Jackson Township and carried on farming and stock raising. His wife was also born in this county, her people being pioneers here.

Darius W. Yates was educated in the public schools of Jackson Township and had some excellent teachers. He was brought up to farm pursuits and in 1909 purchased his present property from John S. Bishop. He has a clear title and the owners can be traced backward from Mr. Bishop to Melvin Duke, to Adam Fulhart, to James Thomas and to Thomas Williamson, who entered the land. Although Mr. Yates is still a young man he has demonstrated his ability as a farmer and has the good health, energy and progressive ideas that will contribute much to his future success. He has three sisters, all older than himself, namely: Daisy May, who married Hally Treece and they live in Jackson Township; Gale, who married James Elsea, lives at Findlay; and Edith, who married William

Snyder, and has her home in Jackson Township.

On September 29, 1907, Mr. Yates was married to Miss Carrie A. Bishop, who was born August 26, 1883, and is a daughter of John and Angeline (Woodruff) Bishop. The father of Mrs. Yates died January 23, 1909, in Eagle Township, but the mother still resides on the homestead there. Mrs. Yates was one of a family of three children: Charles, who died at the age of two years; Sadie, who married Henry Hartman of Eagle Township; and Carrie A., who is Mrs. Yates. Mr. Yates belongs to the Republican party.

JOSEPH R. McLEOD, M. D.,* who has been successfully engaged in general practice at Findlay, Ohio, for a period covering twenty useful years, was born in 1833, in Delaware County, Ohio, and is a son of John and a grandson of Capt. John McLeod.

The grandfather of Dr. McLeod was of Scotch parentage but his birth took place in England, in 1780. He came to America and settled in the city of Philadelphia, and during the War of 1812, he served as an officer, thereby gaining his military title. His home remained in Philadelphia and there his son, John McLeod, was born in 1809. Prior to the birth of his son, Joseph R., the second John McLeod settled in Delaware County, Ohio, in 1865 removing to Missouri, where he died in 1898.

The parents of Dr. McLeod moved from Delaware to Hancock County, in his infancy, and there he completed his earlier school attendance, later enjoying some advantages at the Ohio Wesleyan University at Delaware. That he was a youth of more than ordinary mental equipment is proved by his success in three professions, teaching, the law and medicine. When a boy of seventeen years, managing his first school, he began to read medicine and also to study the principles of law, and in 1863 he was admitted to the bar, after graduating from the law department of the Cincinnati College. It was with the intention of making law his life profession that he then settled at Findlay and opened an office. In the following year he enlisted for service in the Civil War, becoming a corporal in Company I, 161st O. Vol. Inf., and serving four months. After his honorable discharge he went to Missouri, where his parents had located, and engaged in the practice of law at Shelbyville, until 1876, when failing health made him turn his attention to another professional field. In 1877 he was graduated in medicine from the College of Physicians and Surgeons, of Keokuk, Iowa, and settled first at Mt. Cory, in Hancock County, Ohio. He remained in active practice there for three years and later practiced at Benton Ridge for eight more years, coming then to Findlay, where his skill and medical knowledge have been abundantly recognized. In every section in which Dr. McLeod made his home he has impressed his personality upon the people. During six years of his residence at Shelbyville, Missouri, he filled the office of presiding judge of the county court and had many other substantial proofs of the appreciation of his fellow citizens.

In 1862 Dr. McLeod was married to Miss Mary E. Howard, who is a member of an old Findlay family, and three of their children survive: Charles D., who is engaged in the practice of medicine at Chatfield, Ohio; Samuel Howard, who is a resident of Findlay; and Bessie B., who married William P. Wisely. Dr. McLeod's place of residence is at No. 1112

North Main Street, Findlay. He is a Mason and an Odd Fellow.

RALPH W. MOORE, cashier of the Buckeye National Bank, of Findlay, and a prominent and successful business man of that city, was born in Big Lick Township, Hancock County, Ohio, May 12, 1863, on the farm then owned by his father, Ross W. Moore, in Section 17, where the old log cabin is still standing. Mr. Moore spent his early days with his father, mother and brother on the farm until he began teaching school in his home district, where he taught seven terms in succession. While thus engaged at home during the winters he served as deputy county auditor under W. T. Platt during the summer time and afterwards under Auditor C. B. Metcalf, serving nearly eleven years in this office. At tax paying time he assisted in the county treasurer's office at times. In the spring of 1897 Wilson J. Edwards resigned his position as assistant cashier of the Farmers National Bank of Findlay, Ohio, and Mr. Moore was elected to fill the vacancy, which position he filled until the resignation of Mr. J. G. Hull as cashier, when he was elected to fill this new vacancy, holding the position until the reorganization of the bank, January 28, 1904. The old Farmers National Bank was then merged into the Buckeye National Bank and Mr. Moore elected its cashier and is still filling this position. Besides being interested in the banking business, he is a director and stockholder in the Buckeye Traction Ditcher Company, the Buckeye Ice & Coal Company and the Buckeye Hardware Company of Findlay, Ohio; The Buckeye Land & Development Company of Ft. Collins, Colorado, and the Roanoke Land & Development Company of Roanoke, Louisiana.

Mr. Moore is a member of the Methodist Episcopal Church known as Webster Chapel in Big Lick Township, having united with it in early manhood and retaining his membership there. On Christmas Day, 1893, he was united in marriage with Aura M. Ulsh, one of the public school teachers of Findlay at that time, and formerly a resident of Mr. Moore's home township. From this union five children have been born: Ralph W. Moore, Jr., Ethel L. Moore, Helen G. Moore, one that died in infancy, and Alice Loreen Moore. Mr. Moore's mother resides with him at the present time in their new home on South Main Street, where he is always glad to meet his neighbors and friends.

JOHN A. NUSSER,* a much esteemed general farmer and breeder of fancy poultry, is a member of the Hancock County Fair Board, and resides on a farm of eighty acres located about one and three-quarter miles east of Van Buren, Ohio. He was born November 14, 1873, on a farm in Allen Township, Hancock County, Ohio, and is a son of John and Mary (Taylor) Nusser. The family is of German extraction, the paternal grandfather having been a native of that country. The father of our subject was born in Findlay, Ohio, where he was reared and still lives, and the mother, who died in 1893, was a daughter of Charles Taylor, and was born and reared in Allen Township, Hancock County, Ohio.

John A. Nusser was reared on what is now known as the H. L. Taylor farm, which adjoins our subject's farm on the north, and during his boyhood worked for a time in a store at Van Buren, Ohio. He has always followed farming and has resided on his present farm since 1903. Here he carries on general farming, making a specialty of raising Hereford

of the Methodist
Webster Chapel in
; united with it in
ig his membership
893, he was united
lsh, one of the pub-
y at that time, and
.oore's home town-
children have been
, Ethel L. Moore,
ied in infancy, and
Moore's mother re-
: time in their new
where he is always
id friends.

a much esteemed
of fancy poultry,
ock County Fair
m of eighty acres
quarter miles east
as born November
1 Township, Han-
son of John and
family is of Ger-
grandfather hav-
ntry. The father
1 Findlay, Ohio,
ill lives, and the
as a daughter of
rn and reared in
unty, Ohio.
l on what is now
farm, which ad-
e north, and dur-
a time in a store
always followed
his present farm
on general farm-
aising Hereford

RALPH W. MOORE

cattle, and is a breeder of about thirty kinds of fancy poultry. His poultry has won many prizes at various fairs and poultry exhibits of this locality, and Mr. Nusser has been a member of the Hancock County Fair board since 1905. He was elected a member of the Allen Township school board in 1909.

Mr. Nusser was married to Blanche Swab, who is a daughter of Samuel Swab, a prominent farmer of Cass Township, Hancock County, Ohio, and they have one daughter, Dorothy E. Nusser.

H. J. POWELL, M. D.,* who is successfully engaged in the practice of medicine at Rawson, Ohio, is a native of Hancock County, born in Eagle Township, August 9, 1870. His parents are Irvin and Lucinda (Evans) Powell, the former of whom was born in Fairfield County and the latter in Hancock County. They reside on their farm in Eagle Township.

H. J. Powell was reared in Eagle Township and attended school there in boyhood and later was a student in the Findlay schools. He afterwards engaged in teaching, for fifteen years following this profession at North Baltimore, in Wood County, and during nine years being principal of the public schools there. For his educational work he was well prepared, having previously graduated from Angola College, at Angola, Ind., and in 1904, from Findlay College, at Findlay, Ohio. From North Baltimore he entered the Western Reserve College and was graduated with his medical degree in 1908 and took a post-graduate course and received the degree of A. M., in 1909. He located for practice at Rawson, in 1908, and has identified himself thoroughly with the interests of this town. He is serving as a member of the city council, having been elected on the Democratic ticket.

In 1894 Dr. Powell was married to Miss Lena Roberts, a daughter of Henry Roberts, of North Baltimore, Ohio, and they have three children: Rose, Doris and Maxine. Dr. Powell and family are members of the United Brethren Church at Rawson. For twenty years he has been a member of the order of Maccabees and is medical examiner for the Rawson lodge, and since 1908 he has also been identified with the Odd Fellows.

ANDREW G. FULLER, a leading lawyer of the Hancock County bar, and a prominent citizen of Findlay, Ohio, was born in Barry County, Michigan, March 5, 1858. His parents were Geo. S. and Mercy A. (Hill) Fuller. Both were pioneers in Michigan when ox-teams were the generally recognized mode of travel. His father was of New England lineage, but a native of New York; his mother of English and German descent and Canadian birth. During Mr. Fuller's infancy his parents moved to Allegan, Michigan, and later, when he was about six years old, to Kalamazoo, Michigan, at which place he was reared through childhood and youth.

Mr. Fuller received a common school education in the public schools of Kalamazoo, and at that place attended and graduated from Kalamazoo College, completing his collegiate course in 1883, receiving the degree Ph.B., and having later the degree of Ph.M. conferred for post-graduate work. Immediately following his graduation in 1883 he received the appointment of assistant city engineer in the city of Kalamazoo, which position after about two years he resigned to take up the study of law as a profession. He was admitted to practice as a member of the bar of Michigan in September, 1885, by the Circuit Court of Kalamazoo County, with the distinction of having covered the then ordinary two-year course of reading required by the university curriculum in seven months. Following his admission to the bar, Mr. Fuller engaged in active practice of his profession at Cadillac, Mich., where he held for one year the office of city attorney, and for one year that of county superintendent of schools in Wexford County. In August of 1889, drawn by the then growing fame of Findlay as the center of the oil and gas belt of Ohio, he removed to that city, becoming at the time a member of the law firm of Barber and Fuller, which continued until 1896, since which time Mr. Fuller has continued his professional work as the successor of this firm, Mr. Barber having removed to Toledo.

Since taking up his residence in Findlay, Mr. Fuller has been thoroughly identified with the interests of the city as a property owner and citizen, taking part in its movements for civic advancement, and serving it as a member of its Board of Health for many years, and holding the office of local registrar of vital statistics. Professionally he has been interested in and taken part in very many of the cases of large importance that have passed throught the courts in his own and adjoining counties.

He has been for many years prominent as an Odd Fellow, both among local lodge circles, and in the State, having been representative in the Grand Lodge of Ohio I. O. O. F.

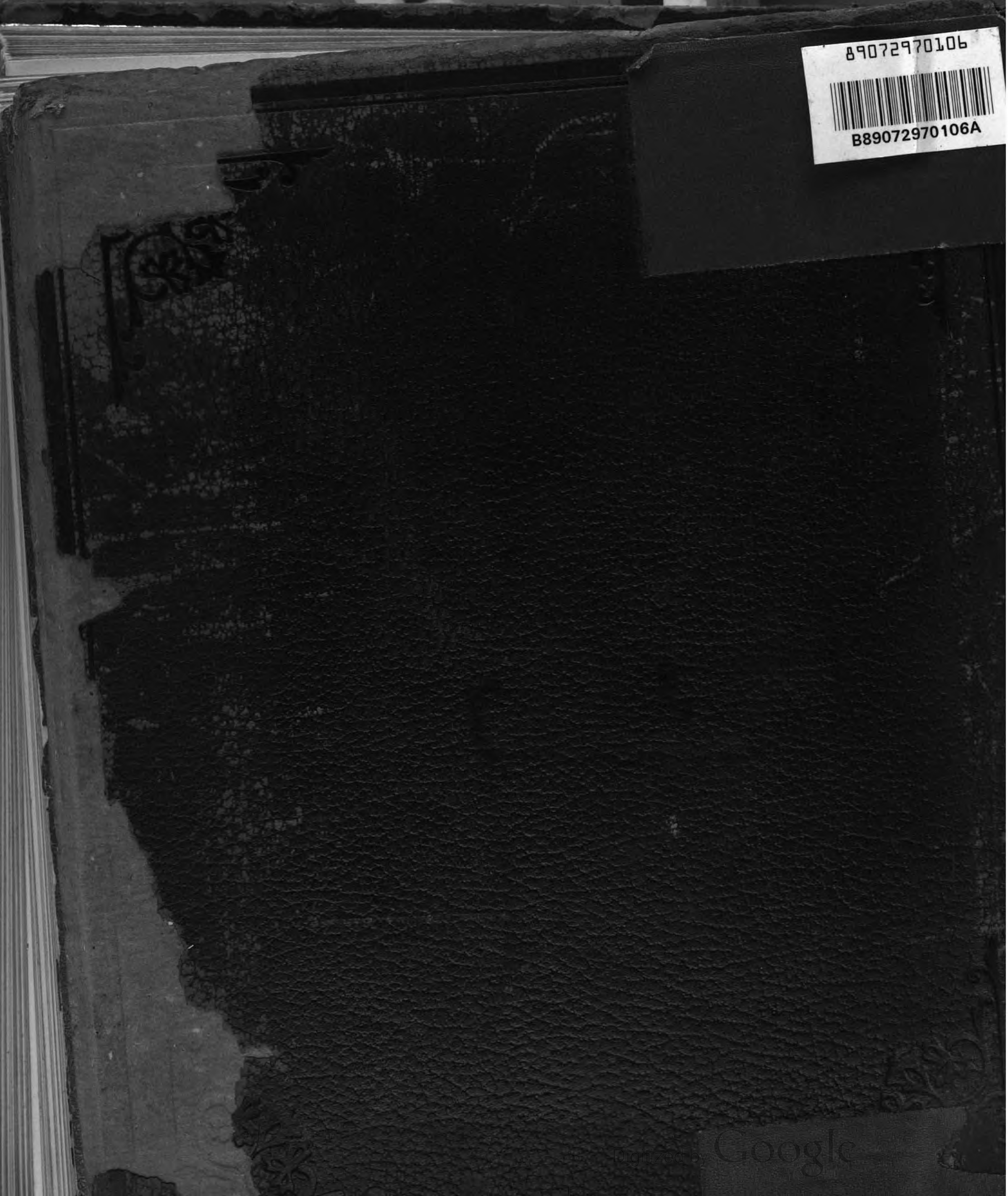
Mr. Fuller was married, October 12, 1887, to Miss Mary A. Peck, of West Bloomfield, N. Y., to which union have been born eight children, of whom seven are living, being in the order of their birth, Henry C., Raymond M., Margaret A., Robert E., Edith N., Frances F. and Ruth E. All were born at Findlay except the oldest son, whose birthplace was at Cadillac.

DATE DUE

[illegible]		[illegible]	
[illegible]		[illegible]	
[illegible]			

DEMCO 38-297

89072970106
b89072970106a



89072970106
B89072970106A

89072970106

B89072970106A

JOH
HOPK
HOSPI

olume
ear
agree to co
the above
gnature
dress

JOHNS
HOPKINS
HOSPITAL

REGENTS OF THE UNIVERSITY OF MINNESOTA
BIO-MEDICAL LIBRARY

233

THE

JOHNS HOPKINS HOSPITAL

BULLETIN

VOLUME XXII

UNIVERSITY OF
MINNESOTA
LIBRARY

BALTIMORE
THE JOHNS HOPKINS PRESS
1911

The Lord Baltimore Press
BALTIMORE, MD., U. S. A.

THE

Vol. XXII—No. 2

Urinary Hyperacidity a
Myalgia.
By Thomas R.
An Analysis of the Cou
sentations.
By Clarence B
Investigation into Seve
Benzol.
By Charles Gl
The Viscosity of the B
By Charles R.

URINA

The etiology of n
been difficult to det
types of cases vario
in neuritis the only
of cases is some poi
out, or produced w
organisms or to d
recognize that man
chemical constitutio
peripheral nerves.
poisoning or autoin
cases the only symp
upon the periphera
may be mentioned
bon monoxide, alco
and sulphonal, and
produced by fevers,
and other infection
affecting metabolis
cachexia, malnutrit
the resistance of th
When we conside
find very similar f

BULLETIN

OF

E JOHNS HOPKINS HOSPITAL

Entered as Second-Class Matter at the Baltimore, Maryland, Postoffice.

—No. 238.] BALTIMORE, JANUARY, 1911. [Price, 25 Cents

CONTENTS.

PAGE

eracidity and its Relation to Neuritis, Neuralgia and

OMAS R. BROWN, M. D. 1

of the Course of Labor in 100 Occiput Posterior Pre-
ns.

ARENCE B. INGRAHAM, M. D. 5

into Several Cases of Poisoning by Vapors of "C. P."

ARLES GLASER 8

y of the Blood in Health and Disease. (Illustrated.)

IARLES R. AUSTRIAN, M. D. 9

PAGE

Sarcoma and Tuberculosis.—Report of a Case.
By J. P. SIMONDS, M. D. 17

Carcinoma of the Right Fallopian Tube Readily Palpable Through the Abdomen. (Illustrated.)
By THOMAS S. CULLEN, M. B. 20

In Memoriam. August Horn. (Portrait.)
By MAX BRÖDEL 21

Notes and News 23

Notes on New Books 24

Books Received 32

RINARY HYPERACIDITY AND ITS RELATION TO NEURITIS, NEURALGIA AND MYALGIA.

By THOMAS R. BROWN, M. D.,

Associate in Medicine, Johns Hopkins University.

ogy of neuritis, neuralgia and myalgia has always lt to determine, although we recognize in certain ses various causative factors. Thus, for example, the only assignable origin in a certain proportion some poison, introduced into the body from with- duced within, either due to the action of micro- or to defective metabolism. We cannot fail to hat many poisons, very different in nature and nstitution, show a peculiar tendency to affect the erves. In some of these cases other symptoms of r autointoxication are present, but in a group of ly symptoms seem to be the effect of these toxins eripheral nerves. Among the etiological factors tioned metallic poisons, as lead and arsenic, car- de, alcohol, various drugs, as aniline compounds al, and the ptomaines and leucomaines; the toxins fevers, as scarlet fever, diphtheria, typhoid fever, fections and poisons in various diseases especially tabolism, as diabetes; affections associated with lnutrition and anæmia, where in all probability e of the nerve is lowered, and cold.

consider the etiology of neuralgia and myalgia we nilar factors—various toxins, exogenous or endogenous, conditions of malnutrition and anæmia, cold, organic diseases of the nervous system, some systemic diseases, especially those of the circulatory apparatus, and direct trauma of the nerves or muscles. We must not forget that certain cases, considered as neuralgia or myalgia, are probably in reality mild case of neuritis. There is unquestionably a distinct hereditary predisposition in a certain proportion of all these cases. Certainly in myalgia, and possibly in neuralgia, the feeling is that in a certain number of cases there seems to be a peculiar susceptibility in members of rheumatic or gouty families.

It is not our purpose to discuss the etiology of neuritis, neuralgia and myalgia *in toto,* but simply to call attention to certain interesting features especially in regard to the chemistry of the urine in that group which from lack of definite causative factors can be spoken of as idiopathic. In this discussion while we recognize that these conditions shade imperceptibly into each other; how, for example, many regard neuralgia as a mild neuritis, and others regard myalgia either as a neuritis or a neuralgia, we shall use the terms in the ordinarily accepted sense, and define neuritis as a definite inflammation of the nerve *with* demonstrable signs of inflammation; neuralgia as a pain strictly confined to a nerve or group of

135663

nerves *without* demonstrable signs of inflammation; and myalgia as more diffuse pain affecting certain muscles, or groups of muscles, probably due to changes in their fibrous constituents.

We wish to present a group of cases of neuritis, neuralgia and myalgia, in which the examination of the urine showed a marked increase of acid; to suggest that this is probably due to disturbances of metabolism, and that the pain represents a symptom of autointoxication; and to note that in certain of these cases the administration of alkalies with the consequent diminution of the acidity is associated with marked improvement in the symptoms.

While the acidity of the urine varies within quite considerable limits in health, broadly speaking we may say that when expressed in terms of deci-normal sodium hydroxide solution it is 25, that is, it takes 25 cc. of deci-normal sodium hydroxide solution to neutralize 100 cc. of urine, phenolphthalein being used as the indicator. A number of years ago we made between 100 and 125 observations on normal human beings, and arrived at these figures, which subsequently have been confirmed by other investigators in this field (Hastings); in certain of the text-books of clinical diagnosis (Wood) as well, .25 is given as the average urinary acidity. Of course, this is markedly dependent upon the specific gravity of the urine, which, in turn, is influenced by the exercise taken, and the amount and character of the ingesta; it is lower, often markedly so, when the specific gravity is diminished, as after the ingestion of large amounts of water, and is higher when the specific gravity is increased by the ingestion of too little water, or by an augmented loss of water from the skin or bowels; but under normal conditions, the patient passing about 1500 cc. daily with an average specific gravity of 1.015, the usual acidity is 25 or thereabouts.

In making our observations we examined, as a rule, the early morning specimens, as these probably represent more closely the average urine of the 24 hours than specimens obtained at any other time of the day, and also because, by this means, we can more easily make our examinations shortly after the urine has been voided.

CONSIDERATION OF CASES.

The series we wish to report comprises 44 cases classified as follows: 5 cases of neuritis, 2 of sciatica, 8 of neuralgia, 11 of neuralgic headache, 5 of lumbago, 1 of torticollis, 23 of myalgia. There were 14 males and 30 females. The youngest case was 16, the oldest 55; no decade predominated.

As regards hereditary predisposition four gave a family history of gout, one of tuberculosis, one of diabetes, one of rheumatism, one of arterio-sclerosis and cerebral hæmorrhage, and one of myalgia and neuralgia. Two of the cases (17 and 19) were sisters, while one (28) was the daughter of two others (16 and 35). It would seem from a consideration of these figures that heredity played a very minor rôle in these conditions.

The digestion and the general habits were good in the great majority of cases; 10 complained of indigestion, either gastric or intestinal, and 10 of constipation, while three used tobacc extensively, six alcohol in considerable amount and five admitted being careless and rapid eaters.

Whether the conditions may be regarded as an expression of a gouty or lithæmic tendency or diathesis is uncertain as six only of the 44 cases could be considered clinically in this category (11, 14, 20, 26, 39, 44).

The hæmoglobin was above 85 per cent in all the cases in which it was taken—a great majority of the 44—with the exception of three (31, 34, 40), in which it was 60, 74 and 70 per cent, respectively. All cases with facial neuralgia or neuralgic headache were especially questioned regarding the condition of their eyes. If there was any suggestion of visual disturbance an oculist was consulted, but in almost all these cases, in fact, with only one or two exceptions, that possibility had already been considered by the patient, and the proper glasses obtained without relieving the symptoms. In the case of the women the suffering was often increased at the menstrual period, at which time, of course, metabolic disturbances are likely to be increased, while in two of the cases the disease came on at the menopause.

It would seem, therefore, that the great majority of these cases developed neuritis, neuralgia and myalgia, not as a result of hereditary predisposition, or indiscretions in diet, exposure to cold or trauma, but from some indefinite cause, as far as we could determine. It, therefore, seems justifiable to regard these cases as idiopathic in origin, and due to a disturbance in metabolism, probably to some circulating toxin, manifesting itself clinically in the production of pain in the affected group of nerves or muscles, associated with an increase in the urinary acidity.

THE URINARY ACIDITY IN THESE CASES.

The acidity was quantitatively determined in each examination, as previously described, from fresh morning specimens. In this series 43 of the 44 cases gave readings, ranging from 35 to 138, and of these 36 had an acidity of 50 or above, 16 of 75 or above, six of over 100, and two of over 125. The average acidity of these 44 cases, which with recurrences furnished 52 readings, was 69.1, that is, nearly three times the normal, 25, as expressed in terms of deci-normal sodium hydroxide solution.

The inspection of our table of cases, however, will demonstrate that the majority show an increase of the specific gravity, and, therefore, it will be fairer to reduce them to a basis of a specific gravity of 1.015, in other words, to determine the acidity if the urine voided were of sufficient dilution to be of the normal degree of density. In 34 of the 44 cases the specific gravity was taken, and the correction made; that is, bringing them to a specific gravity of 1.015 gave an average acidity of 51.5, which shows that although the tendency is to have a urine of higher specific gravity, there is, nevertheless, a real and considerable increase in the acid, the average being a little more than double the normal. In this connection we have assumed that the total amount of solids excreted is the same as under normal conditions, or, in other

No.	
1.	Neuritis: r. bracl lowed by disus
2.	Neuritis: r. bracl Recurrence in
3.	Neuritis: l. brach
4.	Neuritis: severe
5.	Neuritis: severe
6.	Myalgia: thigh.
7.	Neuralgia: facial. Recurrence in 4
8.	Neuralgia: arms.
9.	Myalgia: diffuse..
10.	Myalgia: shoulder
11.	Neuralgia: facial. Recurrence in 6
12.	Sciatica: left. L
13.	Myalgia: diffuse.
14.	Myalgia: diffuse...
15.	Lumbago.........
16.	Myalgia and neura
17.	Neuralgic headache
18.	Myalgia: diffuse. .
19.	Lumbago.........
20.	Myalgia: sévere, d Return of sympt
21.	Neuralgic headache
22.	Myalgia: diffuse...
23.	Myalgia: back and
24.	Myalgia: severe, di
25.	Myalgia..........
26.	Myalgia: severe, di
27.	Torticollis.........
28.	Sciatica........... Recurrence in 2 m
29.	Myalgia: severe, di Recurrence in 8 m Recurrence in 3 m Recurrence in 2 m
30.	Neuralgic headache.
31.	Myalgia. Neuralgic
32.	Neuralgia: face and
33.	Myalgia: diffuse....
34.	Neuralgic headaches
35.	Myalgia: diffuse ...
36.	Neuralgic headaches.
37.	Neuralgia: facial ...
38.	Neuralgic headaches.
39.	Myalgia ....
40.	Neuralgia: facial, se aches ... .
41.	Attacks of neuralgic disturbances......
42.	Neuralgia: facial....
43.	Lumbago..........
44.	Myalgia...........

REPORT OF CASES.

No.	Diagnosis.	Urinary Acidity and Specific Gravity.	Urinary Acidity Corrected to Sp. Gr. of 1.015.	P. H. = Past History. F. H. = Family History.
1.	Neuritis: r. brachial and circumflex, severe type, followed by disuse and atrophy	115	....	P. H.—Neuralgia and sciatica several years ago—severe one year ago. (Urinary acidity = 60).
2.	Neuritis: r. brachial	50—1.020	37.5	F. H.—Gout (maternal side) P. H.—Hard worker, light eater, smokes and drinks in moderation.
	Recurrence in 7 months	69—1.017	60.9	
	Neuritis: l. brachial	69—1.017	60.9	P. H.—Very small eater.
	Neuritis: severe r. brachial, ulnar, and circumflex	75—1.015	75	P. H.—Considerable exposure to cold.
	Neuritis: severe r. brachial	59—1.022	40.0	P. H.—Much worry. Obesity.
	Myalgia: thigh. Neuralgia: leg	61—1.017	53.8	F. H.—Father died of tuberculosis.
	Neuralgia: facial. Myalgia: back	49—1.018	40.8	P. H.—Very small eater, very nervous. F. H.—Nervous.
	Recurrence in 4 months	46—1.016	43.1	
	Neuralgia: arms	51—1.015	51	P. H.—Eczema, attacks of purpura hæmorrhagica. F. H.—Mother had gout.
	Myalgia: diffuse	51—1.009	85	P. H.—Always nervous, careless eater, drinks considerably at times.
	Myalgia: shoulder and back	50	....	
	Neuralgia: facial. Myalgia	65	....	P. H.—Very neurotic. Constipated.
	Recurrence in 6 weeks	51	....	
	Sciatica: left. Lumbago	135	....	Very nervous. Pain in lower back for years.
	Myalgia: diffuse. Neuralgic headache	98—1.025	58.8	
	Myalgia: diffuse	54	....	P. H.—Alcohol and tobacco in large amounts. Large eater. Constipated. Hard worker.
	Lumbago	57—1.015	57	P. H.—Constipated. Gout. Nervous strain.
	Myalgia and neuralgic headache	91—1.026	52.5	F. H.—Father had gout.
	Neuralgic headache: severe myalgia of back	68	....	P. H.—Hard worker, careless eater. Has had attacks of epigastric pain and nausea. F. H.—Arterio-sclerosis.
	Myalgia: diffuse.	49	....	P. H.—Careless eater, alcohol in considerable amounts. Constipated. Nervous. Has epilepsy.
	Lumbago	49—1.018	40.8	Menopausal nervousness.
	Myalgia: sévere, diffuse	88	....	F. H.—Father has diabetes. P. H.—Scarlet fever twice. Large, rapid eater.
	Return of symptoms one year later	101—1.028	54.1	
	Neuralgic headache. Myalgia: diffuse	138—1.027	76.6	P. H.—Scarlet fever once. Constipated. Considerable indigestion. Neurasthenia and psychasthenia.
	Myalgia: diffuse	85—1.025	51	P. H.—Neurasthenia.
	Myalgia: back and legs	55—1.018	45.8	P. H.—Chronic intestinal indigestion.
	Myalgia: severe, diffuse	75—1.028	40.2	P. H.—Nervous indigestion. Constipation.
	Myalgia	79—1.029	40.9	P. H.—Occasional attacks of acute epigastric pain.
	Myalgia: severe, diffuse	99—1.027	55	P. H.—Menopausal nervousness. Obesity.
	Torticollis	70	....	P. H.—Tonsillitis as a child. Malaria one year before. Considerable nervous strain.
	Sciatica	66—1.018	55	F. H.—Father, Case 16. Mother, Case 35.
	Recurrence in 2 months	55—1.017	48.5	
	Myalgia: severe, diffuse	75	....	F. H.—Gout on both sides. P. H.—Double ovariotomy 2 years ago. Has distinct beginning gouty deposits in fingers.
	Recurrence in 8 months	105—1.028	56.3	
	Recurrence in 3 months	75	....	
	Recurrence in 2 months	74	....	
	Neuralgic headache	13—1.012	16.3	F. H.—Mother had rheumatism. P. H.—Neurasthenia and nervous dyspepsia.
	Myalgia. Neuralgic headaches	78—1.026	45	P. H.—Splanchnoptosis. Hæmoglobin 60%. Indigestion.
	Neuralgia: face and arms	80—1.030	40	P. H.—Repeated attacks of tonsillitis.
	Myalgia: diffuse	35—1.005	105	
	euralgic headaches: severe for many years	49—1.015	49	P. H.—Indigestion (hyperchlorhydric). Constipation. Hæmoglobin 74%.
	yalgia: diffuse	52—1.021	37.1	P. H.—Constipation. Nervousness.
	euralgic headaches. Lumbago	60	....	P. H.—Nervous. Constipated. Hard brain worker.
	euralgia: facial	60	....	
	euralgic headaches	70—1.019	55.3	P. H.—Very hard worker, physically and mentally. Splanchnoptosis.
	yalgia	73	....	P. H.—Eats carelessly. Drinks moderately. Hypertrophied heart, and anginoid attacks.
	uralgia: facial, severe repeated attacks of. Headaches	105	....	P. H.—Constipation. Hæmoglobin 65%.
	tacks of neuralgic headache, followed by digestive disturbances	51—1.024	30.5	P. H.—Digestion poor. Used tobacco immoderately, and alcohol moderately.
	uralgia: facial	45—1.018	37.5	P. H.—Constipated. Some indigestion. Previously operated on for appendicitis.
	mbago	48—1.014	51.4	P. H.—Neurasthenia. Pruritus.
	algia	75	....	P. H.—Eczema and pruritus.

words, that the quantity varies inversely with the specific gravity, but more than likely this is not the case, as the solids are probably increased in this group of cases, and, therefore, the total acidity is doubtless higher than the figure given, 51.5.

Increased acidity of the urine is met with in other conditions, and we have described 20 or more cases (Philadelphia Medical Journal, March 2, 1901, New York Medical Journal, March 14, 1903) where the effect of this was to produce symptoms very suggestive of cystitis, notably pain in the bladder and on urination, conditions entirely absent in the present group of cases.

Just why in some instances the brachial nerve, in others certain muscles, and in still others the nerves of the bladder should be selected by the circulating poison or toxin as the source of the signs and symptoms of the individual case we find it impossible to say, but in all probability there have been certain causes in the past history of the patient, which have lowered the resistance of that portion of the body affected.

The Relation of Urinary to Gastric Acidity.

The question may well be asked what is the cause of this increase in the urinary acidity; and does it bear any relation to the acidity of the gastric juice, or is it due to errors in metabolism arising elsewhere? In our series of 44 cases we took test meals in nine, comparing the analysis of the test meal with the specimen of urine obtained at the same time. A study of these cases would seem to show that there is no definite relationship here between the urinary and gastric acidity.

Case	Urinary Acidity.	Corrected to sp. gr. 1.015	Test Meal Free HCl—Total Acid
16	91—1.026	52.5	59—75
19	49—1.018	40.8	0—..
21	138—1.027	76.6	35—50
24	75—1.028	40.2	20—52
25	79—1.029	40.9	43—76
32	80—1.030	40.0	0—22
34	49—1.015	49.0	52—72
41	51—1.024	31.9	0—15
42	45—1.018	37.5	39—63

In nine instances the urinary acidity varied from 45 to 138 or (corrected to a specific gravity of 1.015) from 31.9 to 76.6; the free HCl from 0 to 59, the total acid from 15 to 76, these figures also being expressed in terms of deci-normal sodium hydroxide solution. Of these nine, three had no free HCl; in three the free HCl was between 20 and 40; and in three between 40 and 60. While these are, of course, far too few in number to furnish definite and final conclusions, nevertheless, they suggest that there is little or no relationship between urinary and gastric acidity. It, therefore, seems probable that the urinary hyperacidity met with in these cases is due to metabolic disturbances arising elsewhere, possibly to derangement in the functions of certain of the ferments in the liver or intestines.

It is, of course, quite possible that these cases simply represent a form of atypical gouty manifestation, or a lithæmic tendency. It is worth remembering that in gout and diabetes, with their deranged metabolism, where neuritis and neuralgia are frequent, there is a distinct tendency towards increased acid production, or acid elimination. This naturally suggests that any condition which has as its especial characteristic an increase in the amount of acid produced would seem to possess a peculiar tendency to show symptoms in the nervous tissues, which in turn seem to be peculiarly vulnerable to acids, whatever their chemistry or source of origin.

Treatment.

The treatment of these cases was extremely suggestive along certain lines. In all the cases, believing we were dealing with disturbances of metabolism and that as a consequence toxins were being formed, which in their circulation produced definite lesions or disturbances in certain nerves or muscles, we insisted upon a simple dietary and the drinking of water in considerable amounts; and basing our treatment purely on the urinary findings, we administered alkalies to all in sufficient amount to reduce the urinary acidity to or below normal. It might be well to mention in this connection that in some patients enormous quantities were necessary to bring about this result; thus in a case of very stubborn sciatica of many years' duration, the administration of one ounce of alkali daily for four weeks reduced the acidity of the urine from 138 to only 89, while in many it was necessary to give from half an ounce to an ounce of alkali daily for two or three weeks before the acidity reached rormal.

The alkalies given were usually bicarbonate or citrate of soda, carbonate of lithium, and bicarbonate of potash, while if constipation were present calcined magnesia was frequently added.

In some instances the administration of sufficient alkali with the simple dietary and the drinking of large amounts of water was the entire treatment; and in 17 of the 44 cases (1, 2, 3, 7, 9, 10, 14, 16, 22, 24, 25, 26, 28, 31, 34, 37, 39) the cure was effected by this means with little or no additional treatment, but in some other cases it was found necessary to use different therapeutic agents, such as aspirin, coal-tar derivatives, the salicylates, or even opiates occasionally, the paquelin cautery, and the application of heat or cold.

It seems worth while to mention a few of the cases in detail. Three of the five cases of neuritis obtained almost entire relief in a comparatively short time under this treatment, and one of these (1) had previously been obliged, for between three and four weeks, to take from ½ to 1 grain of morphia daily: the other two cases of neuritis, however, needed sedatives of some kind. One patient (7) with neuralgia and myalgia had noted before he came that his attacks could be stopped by taking large quantities of bicarbonate of soda, while in several of the milder cases (9, 10, 14, 15, etc.) almost complete relief was obtained in a few days' time. In some (14, 20, etc.) it seemed that the regulation of the diet, and the general regimen was really of much greater importance than the administration of alkalies.

That there was an inherent tendency towards this condition was shown by the fact that a number showed a recurrence of regimen was stopped, though in others it produce entire relief for long periods of time.

ossible sometimes to examine the urine after the l been under treatment for a certain length of time, nteresting to note the decrease in acidity that we Of 16, whose urine was examined after they were l or greatly improved, the average acidity was 21.5, acidity was corrected to a specific gravity of 1.015 was 24, that is practically normal; the closeness gures would suggest that the improvement was not ie to the dilution of the urine as to the reduction

uffering from anæmia, iron sometimes combined c, was given (31, 34, 40) while in one case (41) l no effect on the pain, but the administration of o correct the functional anacidity of the stomach tive of almost immediate beneficial results, and suggest that in probably a small proportion of undamental trouble is the disturbance of gastric

ly seems to show that the benefit of the thorough on of the patient in these conditions was often striking to warrant its trial.

this beneficial effect shows that the toxins proeally acid in nature, and are, therefore, neutralized d less harmful by neutralization with alkalies, or e effect of increased water drinking, simple diet s is mainly to improve digestion and stimulate we cannot say, although the former view is cersted by the very rapid and marked improvement y the administration of alkalies in a certain prohese cases, in some, in fact, to such an extent that ggests an elective action.

CONCLUSIONS.

In this article, very brief and fragmentary as it is, we have shown that in a certain group of cases of neuritis, neuralgia and myalgia, which for want of a better term, and in the absence of definite or sufficient etiological factors may be called idiopathic, there is a definite increase in the acid eliminated, although we have not attempted to determine whether this is due to an increase in the acid phosphates, or in the organic acids. We believe, however, that the latter is more likely, and we hope subsequently to investigate this phase of the subject in detail. For want of a better explanation we make the suggestion that this hyperacidity is probably the urinary expression of some abnormality or error of metabolism, probably having little or no relationship with the gastric digestion or the degree of acid in the gastric contents, but more probably due to metabolic disturbances arising lower down in the digestive tract; and that the pain and other manifestations in the nerves or muscles affected are due to some circulating poison or toxin, the condition thus probably being a form of endogenous intoxication. Why certain groups of nerves or muscles should be selected in some cases, other groups in other cases, we are unable to say, though in all probability there has been something in the past history of the patient as trauma, exposure to cold, etc., which has lowered the resistance of the especial nerve or muscle affected.

Finally it seems certain that in some patients the insistence upon a simple dietary and copious water drinking, and, most important of all, the administration of alkalies in sufficient amount to reduce the acidity of the urine to normal, is followed by a very marked amelioration of symptoms; and in a few by their complete disappearance without the aid of other remedial agents.

N ANALYSIS OF THE COURSE OF LABOR IN 100 OCCIPUT POSTERIOR PRESENTATIONS.

By CLARENCE B. INGRAHAM, M. D., Denver, Colorado.

the fact that when the occiput occupies a posn in the pelvis the condition is commonly supe considerable difficulty to the progress of labor, more or less serious consequence to both mother have collected one hundred consecutive cases, the obstetrical department of the Johns Hop-, in order to show that this variety is to be reut little more anxiety than the more common or presentation.

figures of the different observers vary quite put posterior presentations are of frequent ocard and Dubois having found them in 49.8 and of their cases; while in this clinic, in a series by Dr. Williams, there were 16.8 per cent. This he attributes to the fact that the examinations in labor when anterior rotation had already occurred. In my series the percentage is still smaller, 12.03 per cent, due probably to the fact that where the least doubt has existed as to the variety of position, the cases have been discarded, and several diagnosed as of transverse variety really belonged in this number.

All the babies in this series were born at term, and those cases with small children were discarded as not being fair examples for comparison in difficult labor. To be sure of the position of the child, in practically every instance, an internal as well as an external examination was made and the variety of position verified.

In looking for a cause of the occurrence of this variety of position, it was found, in this small series at least, that the condition was slightly more common in the contracted pelvis—the number occurring in normal pelves was 85, while in 15 the pelvis was contracted as follows: Generally contracted in nine, simply flat in two, generally contracted rachitic in one, and funnel pelvis in two cases. The percentage of contracted pelves occurring in the hospital being 13.1 per cent, makes an increase of 1.9 per cent in association with the occiput posterior presentation. Forty-eight of the 100 cases were in multiparæ and 42 in primiparæ. Taking into consideration the cephalic measurements, nothing of importance was gained, the average measurements obtained from the 100 heads being:

	Cm.
Fronto-occipital	11.73
Biparietal	9.38
Bitemporal	7.90
Mento-occipital	13.92
Suboccipito-bregmatic	9.59
Suboccipito-bregmatic circumference	31.80

All of which are seen to be practically normal.

Up to this time, the percentage of operative deliveries at term in the Johns Hopkins Hospital, including posterior positions, is 15.2 per cent, which, though high, is due to the fact that many patients are brought in from outside only because complications have arisen. The number of cases requiring operation in the 100 posterior positions was 18, but slightly higher (2.6 per cent) than that of all cases, and of these 18, 11 were due to causes known to be from conditions other than the posterior position, for example:

	Cases.
Mitral stenosis (patients not allowed to continue in second stage of labor)	2
Contracted pelves	4
Prolapsus of cord	1
Eclampsia	1
Dead infected fœtus	1
Ventral hernia and relaxed abdominal muscles	1
Ankylosis of coccyx	1

Of the remaining seven operative cases, the indications given are as follows:

1—Mid-forceps—R. O. T.—P. Poor pains, in second stage 2 hours and 53 minutes with no advance.

2—Mid-forceps—R. O. P. Fœtal and maternal pulse the indication.

3—Mid-forceps—L. O. T.—P. In second stage 2 hours and 10 minutes. Appearance of mecomium and increased rate of fœtal heart.

4—Mid-forceps.—R. O. T.—P. Relaxed abdominal wall and insufficient vis-a-tergo. Second stage 2 hours and 45 minutes.

5—Mid-forceps—R. O. T.—P. In second stage 3 hours with no advance. Maternal pulse 110 to the minute. Exhaustion.

6—Low-forceps—R. O. P. (Scanzoni application). In second stage for over 2 hours with no advance.

7—Attempted high-forceps—R. O. P. Maternal pulse 130 to the minute. In second stage 3 hours with no advance. Version and extraction. In this case the dystocia seemed to be due almost entirely to the very large size of the child, which was 57 cm. long and weighed 4110 gm. The head measurements were:

	Cm.
O. M.	14.50
O. F.	11.00
Bi-P.	9.50
Bi-T.	8.00
S. O. B.	10.00
S. O. B. circum	32.50

In case four it is doubtful if the variety of position was a factor.

Among these 100 cases, there were seven in which the occiput rotated into the hollow of the sacrum—a condition in which operative interference is quite generally supposed to be necessary; but of these seven, one only required operation, a delivery with low forceps. The remaining six were born readily and spontaneously, the second stage of labor averaging but one hour and two minutes.

In considering the duration of labor for the primiparæ in whom spontaneous anterior rotation occurred, the average was found to be 18 hours and six minutes—the first stage averaging 16 hours and 10 minutes, and the second stage one hour and 42 minutes. For the multiparæ, the average duration was 10 hours and 15 minutes, of which the first stage occupied nine hours and ten minutes, and the second stage 52 minutes.

In the cases in which rotation occurred into the hollow of the sacrum, the labors averaged 14 hours and seven minutes, of which the first stage was 13 hours and the second stage one hour and two minutes. It might be supposed that this condition would require a much longer time, but of these seven cases, five were multiparæ; and unfortunately, with the two cases of primiparæ the time cannot be determined as in one case forceps were applied at the end of two hours, and in the other, the first and second stages were not estimated separately, and both together lasted 10 hours and a half. Also three of the babies were under 3000 grams in weight, the only ones in the series below this figure.

When one compares the duration of labor in this series with that of the various text-books, we find that Williams estimates the first stage as 16 hours, and the second one hour and three-quarters to two hours for primiparæ; and for multiparæ, 12 hours and one hour, respectively. Veit gives the duration of labor as 20 hours for primiparæ, and 12 hours for multiparæ. Varnier, from the records of 2000 cases, one-half of which were primiparæ, estimates it as 13½ and 7½ hours, respectively—the second stage 75 minutes in the former and 35 minutes in the latter. It is seen that, as compared to the times of the first two observers, with this series of occiput posterior presentations the duration is short, while with Varnier's figures it is somewhat longer.

The percentage of perineal tears received during these 100 cases was 26 per cent as against 23 per cent in 200 consecutive cases of the more common anterior variety. Of these 26 perineal tears, 18 were in primiparæ, and eight in multiparæ: 14 of the first and 12 of the second degree. Twelve of the tears were in operative cases, and of these, four were of the first and the remaining eight of the second degree.

Of the seven cases in which the occiput rotated posteriorly there were four tears (55 per cent). This is readily explained when we consider that the vulva, with the more unusual mechanism of labor, is stretched to admit the occipito-frontal diameter of the head (11.75 cm.) instead of the sub-occipito-bregmatic diameter (9.5 cm.) in the occiput anterior variety. In the three remaining cases, in which the occiput

~~ated posteriorly and~~ there were no perineal tears, the babies ere under 3000 grams in weight.

Of the 100 cases there were five fœtal deaths. One baby ved six days with congenital deformity of the viscera and oncho-pneumonia; one had congenital absence of the pylorus nd lived a few days; one with status lymphaticus lived 1½ ours after version and extraction; one was practically still-orn; with this child, version and extraction was tried through funnel pelvis and abandoned for a second attempt with the rceps, by which the head was unduly compressed; and one iild died through perforation of the head; there was a gen-ally contracted pelvis and a long labor without engagement the head. Accouchement forcé was done, and an attempt ith forceps on the floating head tried, which was unsuccess-l. Version and extraction was then resorted to. The head came wedged in the pelvis and perforation of the after ming head became necessary. The conjugata vera meas-ed 10.5 cm., and in this case the method of procedure should ve been pubiotomy. Of these deaths, the last two were due operations dependent upon contracted pelves; in one the lvis was generally contracted, and in the other funnel aped. The posterior variety of position cannot be held sponsible for either one.

Three other babies were slightly asphyxiated at birth. In e there was a pressure necrosis of the scalp from a con-acted pelvis, and in another a facial paralysis followed the plication of forceps. Both recovered completely.

In the series there were two maternal deaths—one patient ed of typhoid fever during the puerperium, the disease be-g present at the time of labor; the other lived one day after livery, and died from chronic myocarditis with dilatation.

In reviewing this rather small series of occiput posterior esentations, it is shown that operative interference need be t little more frequent than in the occiput anterior variety presentation. The duration of labor is slightly more pro-ged and the percentage of perineal tears slightly higher in the anterior variety. The consequences to the mother l child are, however, not much more serious.

t is the procedure in this clinic, when a posterior variety position is diagnosed, to leave the condition to nature, n, as is shown in almost the same percentage of cases as cciput anterior the labor is spontaneous. Many writers cate turning the head to an anterior variety by means of hand introduced into the vagina. This procedure renders patient more liable to infection through manipulation; while in a certain number of cases, if successful, it may n the labor, in the majority, rotation to the symphysis place spontaneously (about 92 per cent), and the labor complicated.

quote Dr. Williams from his text-book:

> en when the occiput rotates into the hollow of the sacrum, the osis is not so very bad. as in the majority of cases spon-s labor usually occurs. No doubt, when the occiput remains ior, there is an increased tendency toward perineal tears, which is particularly marked when the head is born by the less frequent mechanism. But to my mind, the main cause of the dread in which posterior presentations are held is the fact that they frequently escape recognition, and accordingly, if for any reason operative delivery becomes necessary, the forceps is applied improperly—that is, as in occipito-anterior presentations.
>
> "When occipito-posterior presentations have descended into the pelvis, it is my practice to leave them to nature so long as possible, and to interfere only when absolutely necessary. But when convinced that the best interests of the mother and child will be subserved by prompt delivery, forceps should be applied.
>
> "On the other hand, when the head is arrested at the superior strait in a posterior position, version should be resorted to as soon as one is convinced that spontaneous advance will not occur, provided of course, that the operation is feasible and is not contraindicated by disproportion between the size of the head and the pelvis."

As regards the application of forceps, when the occiput has rotated into the hollow of the sacrum and interference becomes necessary, the forceps is applied in the usual manner to the sides of the head with the pelvic curve toward the face, and the occiput drawn out slowly over the perineum in a horizontal direction until the forehead or root of the nose engages under the symphysis, after which the occiput should be delivered over the anterior margin of the perineum by slowly elevating the handles. Then, by imparting a downward motion to the instrument, the forehead, nose, and chin successively emerge from the vulva.

When interference is indicated in an obliquely posterior variety it is attempted to rotate the head to a transverse or even an anterior variety by means of the hands, and then apply forceps in the usual manner. If, however, this cannot be effected the double application of forceps by Scanzoni's method is resorted to and has given such excellent results that it is employed to the exclusion of all other methods.

In the first application, while the occiput is obliquely posterior, the blades are applied to the sides of the head with the pelvic curve looking toward the face of the child, and downward traction is made until the head impinges on the pelvic floor, when a rotary movement is imparted to the forceps, by which the occiput is slowly brought into a transverse or obliquely anterior position. The forceps, which have become inverted, are taken off, and reapplied in the usual manner for the anterior variety—that is, with the pelvic curve toward the occiput, which is now rotated so as to lie under the symphysis, when the extraction is completed in the usual way.

THE JOHNS HOPKINS HOSPITAL BULLETIN.

The Hospital Bulletin contains details of hospital and dispensary practice, abstracts of papers read, and other proceedings of the Medical Society of the Hospital, reports of lectures, and other matters of general interest in connection with the work of the Hospital. It is issued monthly.

Volume XXII is in progress. The subscription price is $2.00 per year in the United States, Canada, and Mexico; foreign subscriptions $2.50.

INVESTIGATION INTO SEVERAL CASES OF POISONING BY VAPORS OF "C. P." BENZOL.

By Charles Glaser, Baltimore.

A little over a year ago I was asked to inspect a can-factory in this city and discover, if possible, the causes which had led to the poisoning of a number of the employees. All of the victims were young girls, and four of them had been removed to the Johns Hopkins Hospital, where one had died, another had been reported dangerously ill, while the remaining two were found in less alarming states.

The attending physician of the hospital joined me in the inspection of the factory, and at the same time examined 14 girls, aged 14 to 18 years, and employed in the same building from which the four victims, first mentioned, had been removed. A number of the men were also examined. All were found to be highly anemic.

The principal work carried on in the building where these people were employed, consisted in preparing the tops of the cans for sealing. Four machines, each one attended by four girls, carried on this operation. The tops, carried by mechanical means, were passed under a brush, and this, also mechanically, provided each disc near its outer edge, with a rim of rubber dissolved in benzol, and thickened by means of bole and ground asbestos.

Two of the girls were employed at this work, whereas the other two spread the tops, after they had passed out of the machine, on racks to dry. Upon evaporation of the benzol there is left a thin rubber ring near the margin of each top, and this makes possible an hermetic closure.

Although all the windows were open, the air in the building, particularly in the vicinity of the machines, smelled strongly of benzol. Upon inquiry it was stated that about 10 gallons of the rubber solution had been used daily for the preceding six months. During this time several large lots had been consumed without detrimental effects of any kind, and it was not until a certain drum marked No. 36 began to be used, that sickness appeared.

A small sample of benzol from drum No. 36 was tested, with the following results:

Specific gravity at 15½° C. = 0.880.

Sulphuric acid gave a distinct straw-yellow color.

Carbon bisulphide was found present in small quantity by the xanthogenate test.

Anilin and nitrobenzol were shown to be present in traces by Jacquemin's test.

A larger sample of benzol No. 36 was thereupon obtained from the factory, and of this 200 cc. were carefully fractionated with the aid of a Le Bel head.

The initial boiling-point was 80° C. which rose gradually to 85½° C., when 190 cc. had distilled over. The remaining 10 cc. were tested for aniline with negative results, and for nitrobenzol, which gave a strong dark blue coloration by Jacquemin's test.

The first death (that of patient W.) had occurred a few days before I was called in, and this case was out of reach of a chemical examination. The attending physician, however, submitted samples of urine from two of the other patients. C., who was critically ill, and died soon afterward; N., who was not so seriously ill, and who finally recovered.

The examination of these urines was conducted as follows: they were distilled in a current of steam, the distillates were exhausted with ether, and the aqueous residues discarded.

To the ether 5 cc. of $\frac{n}{10}$ sulphuric acid was added, and after shaking, run off. After this the ether was washed several times with small quantities of water. The united acid liquids were then neutralized with solid sodium carbonate. One drop of phenol, and several drops of a sodium hypochlorite solution were added. Case C. gave a strong blue color reaction for aniline.

The ether from which the sulphuric acid had been abstracted was tested for nitrobenzol with negative results in the following manner: it was allowed to evaporate spontaneously until only a little remained; upon the addition of alcohol the liquid was transferred to a flask with a long reflex tube; sulphuric acid and zinc were now added, and the mixture in the flask left in a warm place, usually over night. After neutralization, the aniline formed was extracted with ether, and treated as before described.

Case N. gave a faint blue color reaction for aniline. The ether in this case gave a distinct, but not clean blue color reaction when tested for nitrobenzol. This effect may have been due to a small remnant of aniline, a trace of nitrobenzol, or to the presence in the urine of some other substance capable of giving imperfectly and deceptively a test more or less blurred for aniline after reduction.

The urine of another patient, who had nothing to do with the benzol cases, was submitted by the attending physician, and gave, after steam distillation, and further identical treatment, a negative test for aniline, but a faint brown reaction turning slowly to a faint dirty green when tested for nitrobenzol.

The two cases, N. and C., seem to show an interesting connection between the severity of the cases and the strength of the reactions obtained for aniline.

After the death of patient C. her brain was submitted for analysis. About one-fourth of its was pulped, acidulated, and subjected to distillation in a current of steam. Four hundred cubic centimeters of distillate were obtained.

The distillate was exhausted with ether and the latter examined as before described. Only a trace-reaction for aniline was obtained, and a very faint apparent reaction for nitrobenzol, which could not be positively identified by a control test for isonitril. For this reason the latter reaction was considered as probably due to the same substance that gave a [illegible] reaction in the urine not connected with cases.

.due in the still was now made distinctly alkaline by sodium hydroxide, and about 250 cc. were distilled eam. The distillate was then extracted with ether, her was treated as stated before.

iin's test gave a very distinct sky blue color.

istory of these cases is on file at the Johns Hopkins [only wish to point out here, that the symptoms of onic poisoning by minute quantities of nitrobenzol, ifferent from those of acute cases,[1] so much so, that ing physicians at the hospital doubted my results, e presence of one of them, I demonstrated aniline urines which had been submitted, and in the brain ent who died.

clusions to be drawn from these examinations are d direct. The cause of the sickness and deaths was which had been absorbed during long periods in of nitrobenzol and had accumulated in the body ient to cause trouble.

self has been at times declared to be perfectly harm- times has been denounced as dangerous.[2]

of the cases on record in the literature[3] it is stated and nitrobenzol were absent. In view of the fact enzol was concerned in the cases under discussion, robable, that its presence in minute quantities may verlooked for want of sensitiveness in the methods

attempt was made to get at the magnitude of the nitrobenzol present in benzol by comparing the the color produced by Jacquemin's test with pure which known quantities of nitrobenzol had been appeared from these tests that the quantities of nitrobenzol in the fluids analyzed, fluctuated from 1 to 7 mg. per liter. Assuming 5 mg. as the average, 10 gallons or nearly 38 liters per day of the rubber solution used in the factory would contain 190 mg. of nitrobenzol, a quantity, which, for chronic effects, is certainly not negligible. The quantities of aniline present were much smaller, and in the present connection may be neglected.

During the time that the aforementioned analyses were made, samples of various lots of benzol used by the can company during the preceding six months were also examined. The results are tabulated below.

Sample.	Aniline.	Nitrobenzol.	Remarks.
1.	Extremely faint.	None.	Standard by which contract was made.
2.	Extremely faint.	Extremely faint.	59 days later.
Drum No. 36.	None.	Strong dark blue color.	
Drum No. 37.	Faint light blue color.	Distinct light blue color.	
Drum No. 38.	Extremely faint trace.	Strong dark blue color.	
Drum No. 39.	None.	Distinct light blue.	
Drum No. 40.	Very faint trace.	Very faint trace, barely visible blue tint.	

The gap of about 120 days between sample No. 2 and drum No. 36 is regrettable as it is possible that more definite information as to the cause of the presence of the nitrobenzol might have been obtained. The tests, however, show that commercially C. P. benzol, free from nitrobenzol, can be, and at times was, furnished. That nitrobenzol should have appeared in quantities large enough to cause sickness and death, and should then have disappeared again completely, points to some accidental admixture, possibly by the temporary use of some of the drums for storage of nitrobenzol, followed by insufficient cleaning.

Since "C. P." benzol is used largely in the industries, and consequently a considerable number of people are more or less exposed to its vapors, the can company kindly gave me permission to make public the results of my investigation.

---

mmercial Organic Analysis, 3d Ed., Vol. 2, Part 2, p.

Fabriksfeuerwehr, 1909, Vol. 16, pp. 10-11, 13-14.
ftung, München. med. Wchnschr., 1909, Vol. 56, p. 11.
: Arch. f. Hygiene, Vol. XXI, 1897.

IE VISCOSITY OF THE BLOOD IN HEALTH AND DISEASE.

By Charles R. Austrian, M. D.,
Medical House Officer, Johns Hopkins Hospital.

(From the Medical Clinic of the Johns Hopkins Hospital and University.)

of the viscosity of the blood, like the investigaer physical properties, was first undertaken with scovering a further aid to clinical diagnosis and therapeutic paths. Many methods for measurity have been devised, a critical review of which ecent article by Determann.[1]

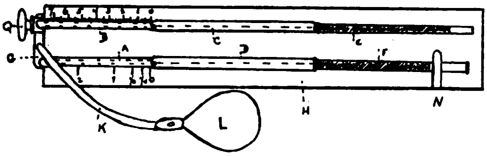
ere reported will be dealt with under two cap-

sity of the blood in normal individuals, includtion of the factors concerned in the production

II. The viscosity of the blood in disease, a collection of numerous clinical observations in various diseases with an explanation, where possible, of the changes which occur.

In all the determinations made, the Hess[2] Viscosimeter was used. The instrument is not well known in this country so a description of it may not be amiss.

On an opaque glass base, H (see drawing), two graduated glass tubes, A and B, are fastened which are connected at one end by a third tube, G, and this in turn is in communication through a branch with the rubber balloon, L. At the other end, the two tubes, C and D, are drawn to capillaries of very fine caliber which widen again to the bore of A and B. The tube, F, placed on H and held there by the support N, is removable, and can be replaced by any of a number of similar ones. By means of the stop-cock Q, it is possible to establish or to interrupt the communication between B and G, and so between B and the balloon L. The tubes A and B are bent to a right angle at their junction with G. Interposed between the rubber tube K, and the balloon L, is a glass tube which communicates by an opening with the air.



HESS VISCOSIMETER.

The entire apparatus is contained in a case 29 x 9 x 6 cm., having compartments for tubes similar to F, for a flask of ammonia, to be used in cleaning the instrument, and a thermometer mounted on H.

The method of making determinations is as follows: In the tube B-C-E is a column of distilled water, the left meniscus of which is at 0 (zero). A tube F is filled by capillary action with blood. It is then placed in position end to end with D, and by means of suction exerted by L the blood column is drawn up to 0 (zero). The cock Q is then opened and under the suction of the bulb, the water and blood flow through the tubes A and B.

As soon as the blood reaches 1 (on the scale) suction is discontinued and the readings are made. The mass of water which has risen in B, as shown on the scale, gives the relation of the viscosity of the blood in question to that of distilled water.

Water and blood are now expelled by pressure on the bulb L, the cock Q being closed when the water reaches 0 (zero). F is removed, and the tube DA is cleaned with ammonia twice drawn into it.

If the blood is very viscid or coagulates rapidly, it may be drawn to one-half or one-fourth, and the values obtained multiplied by 2 or 4, respectively.

Controls made with fluids of known viscosity show an accuracy within 1-2 per cent.

Experiments by Hess showed, that with every rise in temperature of 1° C., the viscosity decreases 0.8 per cent. Observations at ordinary room temperatures show an error of about 4 per cent which, in relation to other errors which may arise due to the personal equation, is negligible. A correction is necessary, then, only when there are great variations in the temperature.

The blood for our experiments was obtained from a needle stab in the ear lobule, previously cleaned with alcohol. In those cases in which determinations on the plasma were made, the blood was drawn from the median basilic vein by venepuncture, and coagulation was retarded by the addition of dry hirudin * as recommended by Determann.[3]

In making the determinations, an absolutely fixed temperature was not maintained, the suction force varied, and errors probably arose in drawing the blood. These factors, however, were present in all the experiments, could not be excluded, and therefore do not vitiate the results.

I. THE VISCOSITY OF THE BLOOD IN NORMAL INDIVIDUALS.

The normal viscosity is difficult to determine; first, because it is not always easy to decide just who is normal; and second, because of marked physiological variations in the viscosity of the blood. That various observers do not agree as to the normal, is shown by the table here given:

			Man.	Woman.
Hess[4]	4.57	Determann[8]	4.798	4.516
Bence[5]	5.4	Kottmann[9]	5.11	
Rotky[6]	5.12	Robert-Tissot[10] ..	4.79	4.51
Hirsch & Beck[7]..........	5.1			

We chose for these observations students varying in age from 21 to 28 years—robust young men. The readings showed:

5.0	4.8	4.5	4.4	4.5
4.6	4.6	4.7	4.3	4.5
4.4	4.4	4.4	4.6	4.4
4.7	4.5	4.6	4.5	46
4.5	4.4	4.6	4.7	4.5

The average in these cases gives 4.55 as the viscosity for adult men between the ages of 20 and 30 years.

Similar determinations made on healthy women, in the same decade of life, showed:

4.5	5.0	4.6	4.3	4.5
4.7	4.5	4.3	4.5	4.3
4.9	4.3	4.8	4.6	4.4
4.6	4.5	4.5	4.4	4.2
4.8	4.3	4.3	4.7	4.3

Thus the normal for women—4.51—is very little different from that in men.

Hess[4] and others have shown that the viscosity of the blood varies with age. Low values as 3.89 (male) and 3.80 (female) present in the first decade, are supplanted by rising values as life advances.

Variations with the time of day, digestion, rest in bed, muscular activity, body weight, body temperature, menstruation, pregnancy, etc., have been previously noted.

The relative importance of the other physical and chemical properties of the blood in determining its viscosity, is much mooted. Viscosity does not vary directly with the specific gravity—" low viscosity values occur with high specific gravity

---

* Hirudin is a scaly solid, soluble in water, obtained from an extract of the buccal glands of the leech—Hirudo medicinalis. It has the power of retarding coagulation of the blood even when used in minute quantities, and has no influence on viscosity.

~~sory, due probably~~ to the fact that, whereas all the of the blood enter into the production of the specific ıly some of them influence the viscosity" (Adam[11]). ılood is not iso-viscous, the more viscid substances he erythrocytes losing some of their potency.

emoglobin and viscosity do not always vary in direct is shown below:

obin.	Viscosity.	Hæmoglobin.	Viscosity.
	3.2	30	3.0
	4.5	100	5.0
	4.5	60	3.8
	4.5	42	2.6
	4.3	75	4.2
	4.0	73	3.4

ıe constancy of the relation between the number of rpuscles and the viscosity of the blood, no little dis s arisen. Determann (*l. c.*[8]) notes that "though a parallel exists between the two, so many exceptions that on the determination of the red-cell count no ence as to the viscosity can be drawn." Burton the other hand, maintains that "the red corpuscles incipal factor in determining the viscosity of the

earlier observations, it seemed that a direct relation ıese two factors could be demonstrated. So close this relation seem, that we felt able to estimate the ınt from the readings obtained on the viscosimeter. t series of observations, however, have shown that e viscosity of the blood and the number of the s frequently do vary in direct proportion, in many o close parallelism can be proved.

	Viscosity.	R. B. C.	Viscosity.
0	2.9	3120000	3.1
0	3.6	4000000	4.3
	3.2	2080000	2.6
	2.6	2100000	2.0
	4.4	4220000	4.1
	2.6	4900000	4.1
	4.4	3700000	4.0
	4.3	3900000	4.0
	3.9	4000000	5.0
	3.9	4000000	4.3
	4.6	3800000	4.2
	4.6	4400000	4.2
	4.7	2760000	3.0
	5.5	3300000	3.0
	4.7	5120000	5.1
	4.9	4700000	5.0
	5.2	5000000	4.5
	4.2	4320000	4.6
	3.4	2975000	3.1
	4.6	4100000	3.3

to estimate, if possible, of just how much im red corpuscles are in determining the viscosity the following experiments were performed:

bic centimeters of blood were drawn under aseptic om the median basilic vein, into a syringe con m. of dry hirudin and the viscosity of the whole ned. A part of this blood was centrifugalized itation of the formed elements was complete. ınt plasma was pipetted off and the viscosity of The corpuscles were then washed with physio solution, and suspensions made, until the cell count was the same as that of the blood used. The viscosity of this suspension was then determined, and making allowance for that of the saline solution, we had the coefficient for the red corpuscles.

Blood.	Plasma.	R. B. C.	Saline.
5.2	1.9	2.4	1
4.6	1.7	2.2	..
4.5	1.8	2.0	..
4.7	2.0	2.3	..
4.3	1.8	1.9	..
5.0	1.7	2.2	..
4.9	1.9	2.4	..
4.4	1.9	1.9	..
5.1	2.0	2.6	..

From these findings it seems evident that though the number of red cells in the blood is an important factor, it cannot be the dominant element in determining the viscosity of the blood. The significance of the plasma is also well shown, and variation in its composition must be of no little moment in causing fluctuations in the coefficient for the whole blood.

The influence of hæmoglobin on the viscosity has been demonstrated by Adam (*l. c.*). This author noted that in centrifugating blood, whenever slight hæmolysis occurred, the coefficient of the tinted plasma was higher than when a clear plasma was obtained. In order to prove whether the increased viscosity was due to hæmoglobin, he dissolved crystals of horse hæmoglobin in human plasma and found rising values with increasing concentrations. He then laked blood by alternately freezing and warming it, and found on centrifugation two layers—the upper, a colloidal fluid free of corpuscles with a coefficient higher than that of the whole blood; the lower layer was so thick with the stroma of the cells that its viscosity was extremely great. The increased viscosity of the laked blood is probably due largely to the increased protein content of the plasma, consisting mainly of hæmoglobin. That this last is true, he showed by demonstrating that, whereas carbon dioxide passed into normal plasma had no effect on its coefficient, when it was passed into the plasma of hæmolyzed blood a rise in viscosity occurred.

The observations on the plasma of whole and of laked blood we have been able to confirm in a series of ten cases.

Case.	Normal blood.	Laked blood.	Normal plasma.	Laked blood plasma.
I	4.9	5.7	1.9	5.1
II	4.5	5.2	1.8	4.7
III	4.0	5.9	1.9	4.3
IV	4.6	5.2	1.7	4.8
V	5.0	5.9	2.0	5.1
VI	4.3	5.0	1.8	4.4
VII	4.4	5.1	1.7	4.6
VIII	4.6	5.3	2.0	4.7
IX	4.7	5.4	1.8	4.8
X	4.5	5.6	1.9	4.8

This relation between whole and laked blood had previously been pointed out by Determann (*l. c.*[8]), who explained the higher readings in the hæmolyzed blood as due to the liberation of highly viscid substances, normally contained within the stroma of the erythrocytes, and thus prevented from influencing the viscosity of the whole blood. He found clinical evidence to support this view in observations on a case of black water fever with hæmoglobinæmia, in which, while the patient was well, the laked and the whole blood differed greatly in viscosity, whereas during an attack of hæmoglobinuria the difference was less marked. In this instance, too, he had an indication that the viscosity of the blood is to some extent at least dependent on the osmotic tension between the plasma and the red corpuscles, and the difference between the coefficients of whole and of laked blood may perhaps be an expression of the resistance or fragility of the red corpuscles in health and in disease.

A priori, the proteid content of the blood would be an important element in the production of the viscosity of the blood, and support is given this hypothesis by the experiments of Burton-Opitz[18] on animals and by the observations of Determann (*l. c.*[8]) on man.

The former noted that the blood of dogs fed on meat has a higher viscosity than that of dogs, hungry, or on a low proteid diet. He also found that food rich in fat raises the coefficient of the serum especially, whereas proteid food raises that of the whole blood.

Determann (*l. c.*[8]), studying the viscosity in vegetarians and in meat eaters, found that the coefficient in the former was low compared to that of the latter—4.32 : 4.85, though the hæmoglobin, specific gravity, and the number of the formed elements of the blood were not different. If these findings stand the test of further observations, they may furnish a valuable clue to dietetic regulation in those diseases in which it seems advisable to reduce the viscosity of the blood. The metabolic experiments of Bence (*l. c.*), however, showed no changes in the viscosity of the blood after the use of diets over short periods of time. Similarly, in 35 cases of cardiac disease in the Johns Hopkins Hospital, the feeding of a modified Oertel diet, over periods of from two to six weeks caused no appreciable alteration in the viscosity coefficients.

The influence of various salts has also been studied by Adam (*l. c.*). In a series of careful experiments, this author found that the viscosity of a solution rises with the increase of its proteid content and in general with the salt concentration. "But all salts do not influence viscosity to the same degree, the multivalent salts having a greater influence than the univalent. Among the latter, the iodides and potassium bromide are unique, in that they decrease the viscosity." This last observation lends support to the work of Müller and Inada[14] that iodides, given therapeutically, diminish the viscosity of the blood, but Adam asserts "that ordinary doses of the iodides rarely have a viscosity-lowering action, and at times even a viscosity-raising effect may be noted."

That the gaseous content of the blood is important in its effect on viscosity, has long been recognized. Koryani and Bence[15] found maximal values when saturation of the blood with carbon dioxide was reached, and that as this gas was replaced by oxygen, the viscosity decreased to a minimum beyond which the further addition of oxygen caused it to rise again. The work of Hamburger[16] and of Limbeck[17] indicated that as the carbonic acid content of the blood increases, the red corpuscles take up water and anions from the plasma, whereby the volume of each cell becomes greater, while the proteid, fat and sugar content, the mass of dry residue, specific gravity and osmotic pressure of the plasma rise, to fall again when the carbon dioxide is driven out.

Burton-Opitz[18] demonstrated similar changes by having dogs breathe alternately normal air and air surcharged with carbon dioxide, and Rotky (*l. c.*) noted a decrease in the viscosity of the blood when a patient with emphysema and cyanosis was given oxygen inhalations.

The viscosity-raising action of carbon dioxide we have demonstrated by rebreathing experiments.

A rubber mask, such as is used in giving gas anæsthesia, was closely fitted over the nose and mouth of a patient, and he was made to breathe over and over again the air contained in a four-liter rubber balloon. Rebreathing was continued until tachypnœa and cyanosis were pronounced, when the mask was removed. The viscosity of the blood determined just before, during and 30 minutes after the experiments are here tabulated:

Before rebreathing.	During rebreathing.	After thirty minutes.
4.5	4.8	4.6
3.7	4.4	3.9
4.2	4.6	4.2
4.6	4.9	4.7
3.9	4.3	4.0
4.0	4.5	4.2
4.3	4.6	4.3
4.5	4.6	4.5
4.8	5.0	4.8

In every instance the viscosity of the blood was increased during the experiments, to decrease again when normal air had been breathed for 30 minutes.

CONCLUSIONS.

1. The viscosity of the blood is a variable factor, determined to some extent by the variations in the constituent elements of that fluid.

2. It is slightly greater in men than in women.

3. The viscosity of the blood depends on the number of the red corpuscles, the hæmoglobin content, the gaseous richness; and to a lesser degree, on the proteid, fat and salt composition of the blood. With no one of these factors does viscosity vary in direct proportion.

4. The viscosity of the plasma is normally 1.7-2.0, average 1.86.

5. The viscosity of the blood is not influenced by diets used over short periods of time.

II. THE VISCOSITY OF THE BLOOD IN DISEASE.

When the influence on the viscosity of the blood, which the factors just cited exercise is recalled, it would seem probable that in those diseases in which the blood is most affected the maximal alterations in the viscosity would be found. It would seem likely for instance, that the readings would be low in

[redacted]; low in hydræmia, high in con-
th marked salt retention, and so on. To what ex-
priori reasoning is valid, the following observations

A. SECONDARY ANÆMIA.

:his heading are collected anæmias of different de-
:verity occurring in diverse functional and organic

ase.	R. B. C.	W. B. C.	Hæmo-globin.	Viscos ity.
ıbricoides	3,300,000	9,900	68%	3.2
of sigmoid	2,840,000	8,300	30	2.8
of rectum........	2,530,000	13,000	28	2.4
ırism	3,496,000	8,800	40	3.6
ırism	3,620,000	9,500	44	3.7
›aralytica	4,220,000	5,900	50	4.1
alis	4,500,000	7,100	56	4.2
....	3,700,000	5,100	40	3.5
s peritonitis	2,600,000	10,600	30	2.4
›r	3,540,000	7,900	36	3.1
....	2,320,000	7,160	56	1.8
....	3,900,000	6,800	60	3.2
phritis	4,130,000	19,480	92	2.6
phritis	4,480,000	6,000	76	4.4
s	2,200,000	4,600	62	3.6
ver	4,320,000	6,100	70	4.4
·aplegia	3,648,000	9,000	51	3.6
ver, convalescence.	4,272,000	8,100	76	4.2
....	3,120,000	5,600	63	3.1
:tiary	4,000,000	6,000	70	4.3
of stomach	2,700,000	11,000	50	2.9
s meningitis	3,920,000	12,100	52	3.8
ver	4,300,000	7,200	67	4.3
ver	4,000,000	6,600	63	3.9
›ræcox	4,300,000	5,800	80	4.2
ds	2,160,000	9,900	40	2.0
ia	4,100,000	7,500	80	3.9
ıia	3,900,000	6,380	61	3.7
ırosis	4,320,000	8,100	73	4.2
sentery	4,200,000	9,600	67	4.2
of stomach	2,080,000	12,200	47	2.6
....	3,610,000	11,400	44	3.7
ellitus	3,600,000	7,600	64	3.6
liver	4,208,000	8,000	90	4.4
liver	3,870,000	9.200	81	3.7
emens	4,180,000	10,100	70	4.1

is tabulation it is evident that the viscosity of the
iminished in anæmic individuals, and that the
is roughly proportional to the severity of the

le interest is the gradual return of the viscosity to-
ıal with the onset of convalescence, a fact pre-
d by Determann (*l. c.*) and beautifully shown in
ses.

CASE I.

	R. B. C.	Hæmoglobin.	Viscosity.
....	3,496,000	40%	3.6
....	3,620,000	44	3.7
....	3,900,000	39	4.0
....	4,220,000	50	4.0
....	4,520,000	59	4.4
....	4,900,000	81	4.5

CASE II.

	R. B. C.	Hæmoglobin.	Viscosity
....	2,200,000	30%	2.5
....	2,300,000	30	2.5
....	2,500,000	32	2.7
....	3,000,000	38	3.1
....	3,450,000	40	3.3
....	4,100,000	51	3.7
....	4,000,000	60	3.8
....	4,650,000	78	4.3

B. PRIMARY ANÆMIA AND LEUKÆMIA.

I. Primary Pernicious Anæmia.

Case.	R. B. C.	Hæmoglobin.	W. B. C.	Viscosity.	
				Blood.	Plasma.
1	1,950,000	40%	7300	2.0	1.5
2	780,000	43	8000	1.9	1.1
3	1,072,000	50	9200	2.3	1.3
4	2,225,000	61	6300	2.5	1.4
5	1,220,000	50	8700	1.7	1.2

II. Leukæmia.

Case.	Type.	R. B. C.	W. B. C.	Hæmoglobin.	Viscosity.	
					Blood.	Plasma
1	Myelogenous	3,000,000	339,000	60%	6.2	2.4
2	"	2,800,000	76,000	58	3.9	1.8
3	"	3,600,000	40,000	65	4.7	2.0
4	Lymphatic	2,320,000	46,400	56	3.6	1.9

Table I shows that in primary pernicious anæmia, as in secondary anæmias, the viscosity of the blood is low, and here, too, the coefficient of the plasma is subnormal.

Table II, on the contrary, shows that in leukæmia, though the viscosity of the blood may be decreased, due probably to the marked anæmia, the readings are not as low as would be expected, and in some cases hyperviscosity may be noted. Rotky (*l. c.*) found similar changes and also noted an increased viscosity of the plasma. He finds an explanation for the relative and absolute high values in leukæmia in the marked leucocythæmia.

C. POLYCYTHÆMIA.

If conclusions can be drawn from the observations on the influence of erythrocytic and hæmoglobin richness of the blood on viscosity, these cases should show high coefficients, and in the four cases examined this was true.

Disease.	R. B. C.	W. B. C.	Hæmo-globin.	Viscosity.		
				Blood.	Plasma.	
Mediastinal tumor..	8,120,000	6.900	119%	13.6	2.9	Cyanosis.
Obesity	7,620 000	5,300	105	8.3	2.2	No cyanosis.
Osler-Vaquez disease	6,049,000	7,800	102	6.2	2.4	Cyanosis.
Emphysema........	6,320,000	9,400	104	6.1	2.3	Cyanosis.

In all four the viscosity of the plasma was also increased, confirming the observation of Kottmann (*l. c.*).

D. NEPHRITIS.

Diagnosis.		R. B. C.	W. B. C.	Hæmo-globin.	Viscosity.		Blood pressure.
					Blood.	Plasma.	
Chr.	nephritis	3,240,000	7,560	65%	3.2	2.1	220
Acute	"	5,048,000	15,400	85	3.9	2.3	108
Chr.	"	5,800,000	6,000	100	5.6	2.1	180
"	"	4,300,000	6,200	80	3.9	2.0	180
Acute	"	5,000,000	15,800	90	4.0	2.2	195
"	"	5,120,000	11,400	99	4.3	2.4	173
Chr.	"	3.640,000	9.300	60	3.8	2.1	140
"	"	3,230,000	7,400	75	3.6	2.0	210
"	"	2,000,000	5,900	63	3.2	2.1	192
"	"	3,720,000	9,300	60	3.9	2.3	155
"	"	3,500,000	7,000	59	3.8	2.0	198
"	"	4,120,000	5,900	76	4.2	1.9	144
"	"	4,700,000	8,300	81	4.3	2.1	150
"	"	4,340,000	8,600	80	4.1	2.4	194
"	"	4,600,000	7,300	79	4.4	2.0	187
"	"	3,980,000	6,900	66	3.9	1.8	162
"	"	3,820,000	7,900	69	4.0	2.0	155
Acute	"	4,650,000	5,300	70	4.5	2.2	185
Chr.	"	3,920,000	6,200	72	4.0	1.9	173
"	"	5,000,000	7,100	90	5.1	2.3	148
"	"	3,000,000	9,000	72	2.8	1.9	110
"	"	3,120,000	5,400	55	3.2	1.7	151
"	"	4,200,000	7,300	73	4.1	2.0	186
"	"	4,750,000	6,500	77	4.3	2.1	192
"	"	3,910,000	6,900	68	3.6	1.9	174
"	"	3,300,000	7,800	62	3.7	1.7	139

In 22 of the cases the viscosity of the blood was subnormal, in two about normal, and in only two above normal. In 13, there was hypervicosity of the plasma, a normal coefficient in 13, and hypoviscosity in none. These statistics are in complete agreement with those of Rotky (*l. c.*)

The low viscosity of the blood probably finds its chief explanation in the anæmia present, while in a few instances it is not unlikely the result of hydræmia. As a further factor in bringing about hypoviscosity, Bachmann[19] considers globulin. He says "crystallizable bodies have a lower viscosity than non-crystallizable ones. Globulin belongs to the first group, and since in nephritis a relative globulin increase occurs, this condition may contribute to a reduction of viscosity." As to the cause of the hyperviscosity of the plasma, we may speculate on the presence of retained products of metabolism, perhaps protein, perhaps salt, their effects on the viscosity of the whole blood veiled by the greater influence of the formed elements, hæmoglobin, etc., but made clear when these are removed by centrifugation.

Interesting in connection with renal disease is the relation of the viscosity to blood pressure. In 18 of the cases there was hypertension (155-220 mm. Hg.), in two there was hypotension, and in six the tension was about normal. The study of the protocol of the cases shows that no constant relation exists—with hypertension there may be hypoviscosity or hyperviscosity and *vice versa*. Many of the patients with increased pressure, however, showed lowered viscosity of the blood, due perhaps, as Bachmann has suggested, to the indirect influence of hydræmia—"hydræmia leads to increased heart action and correspondingly to high pressure in order that, in spite of the thinning of the blood, the tissues may still be properly nourished."

E. CARDIAC DISEASE.

I. With Œdema.

Disease.	R. B. C.	W. B. C.	Hæmoglobin.	Viscosity.		Remarks.
				Blood.	Plasma.	
Myocarditis.	2,840,000	8,000	40%	2.9	1.8	Anasarca; no cyanosis.
Aortic and mitral insufficiency....	3,960,000	6,000	51	3.8	1.5	Œdema of legs; no cyanosis.
Mitral insufficiency...........	3,520,000	6,600	58	3.9	1.7	Ascites; œdema; no cyanosis.
Myocarditis.	4,200.000	7,800	69	4.4	1.8	Œdema of legs; no cyanosis.
Aortic and mitral insufficiency....	4.800,000	10,400	63	4.4	1.2	Hydrothorax; œdema of legs; no cyanosis.
Aortic insufficiency...........	3,120,000	8,900	48	3.6	1.3	Anasarca; hydrothorax.
Mitral insufficiency; myocarditis.	3,680,000	12,300	52	3.9	1.5	Anasarca; no cyanosis.
Mitral stenosis and insufficiency....	4.530.000	14,100	67	4.3	1.4	Moderate cyanosis.
Mitral insufficiency...........	4.670,000	9,600	69	4.9	1.6	Marked cyanosis.
Myocarditis.......	3.700,000	8,900	55	4.0	1.7	Œdema of legs; no cyanosis.

Hypoviscosity occurs in this series almost without exception. The low values are doubtless due in part to the anæmia, in part to the hydræmia. The latter probably stands in a causal relation to the diminished viscosity of the plasma.

II. Without Œdema.

Disease.	R. B. C	W. B. C.	Hæmoglobin.	Viscosity.	Blood pressure.	Remarks.
Mitral insufficiency...........	4,792,000	9,800	82%	4.7	150	No cyanosis.
Aortic insufficiency...........	3,496,000	11,000	45	3.9	195	No cyanosis.
Mitral and aortic insufficiency ...	4,220,000	7,500	60	4.5	166	No cyanosis.
Myocarditis......	4,520,000	10,200	58	4.7	180	Slight cyanosis.
Myocarditis.......	3,984,000	8,600	71	4.0	189	No cyanosis.
Mitral stenosis and insufficiency....	5,280,000	12,000	92	5.0	140	Marked cyanosis.
Mitral insufficiency...........	5,000,000	7,400	90	5.0	170	Marked cyanosis.
Myocarditis.......	3,620,000	6,600	53	4.2	210	No cyanosis.
Mitral stenosis and insufficiency....	5,400,000	9,500	93	5.2	185	Marked cyanosis.
Mitral insufficiency.	5,200,000	14.000	91	5.1	190	Marked cyanosis.

In this group no constant alteration in the viscosity values are found. The low readings correspond in the main with the anæmia, the high readings with the polycythæmia and the cyanosis. The blood-pressure viscosity ratio, as in nephritis, is inconstant, though occasional instances of association of low viscosity with high tension does suggest a compensatory mechanism.

F. DIABETES MELLITUS.

No.	R. B. C.	W. B. C.	Hæmoglobin.	Viscosity.		Remarks.
				Blood.	Plasma.	
1	4,930,000	7,200	91%	5.2	2.2	Young man, obese.
2	5.300,000	9,400	98	5.4	2.3	Young man, thin; acidosis.
3	5,640,000	6,900	100	5.9	2.8	Obese woman; acidosis.
4	4,520,000	8,600	89	4.3	1.7	Thin woman, young.
5	4,700,000	9,800	86	4.2	1.9	Obese woman, aet. 60.
6	5,000,000	7,700	92	4.8	1.8	Obese woman, aet. 42.

Three of the cases show increased viscosity of the blood and of the plasma—one shows high normal values, and in the remaining two, low readings for the blood, and normal ones for the plasma were obtained.

The increased viscosity of the blood is here probably due to the relative polycythæmia, the result of concentration of the blood due to the polyuria. As to the factors concerned in the production of hyperviscosity of the plasma, concentration, lipæmia, and hyperglycæmia all probably play a rôle. That lipæmia would raise the viscosity of the plasma is to be expected from the observation of Burton-Opitz (*l. c.*[11]) that "in dogs, food rich in fat raises the viscosity of the serum especially." The same observer found "inconsiderable" rises in viscosity in dogs with artificially produced hyperglycæmia.

G. JAUNDICE.

Diagnosis.	R. B. C.	W. B. C.	Hæmoglobin.	Viscosity.	
				Blood.	Plasma.
Cholelithiasis	5,100,000	14,300	94%	5.2	2.1
Cholelithiasis	4,900,000	19,200	90	5.0	2.0
Cholelithiasis	4,820,000	10,200	90	4.8	1.9
Carcinoma of bile ducts.	3,700,000	26,000	73	4.6	2.0
Carcinoma of pancreas..	2,920,000	9,400	58	5.3	2.4
Catarrhal jaundice	5,000,000	8,900	96	5.1	2.2
Catarrhal jaundice	4,780,000	14,000	86	4.9	2.0
Acute hepatitis	4,200,000	18,000	80	4.7	1.8
Luetic hepatitis	4,600,000	7,000	82	5.0	1.9

The high coefficient here is probably due to the cholæmia which was present in all of the cases.

H. ACUTE INFECTIOUS DISEASES.

I. *Typhoid Fever.*

The unusually large typhoid fever service in the Johns Hopins Hospital furnished a long series of these cases in which ny characteristic changes in the viscosity of the blood could studied. The influence of restricted diet, of febrile reaction d of cold sponges and tubs could also be noted.

o.	R. B. C.	W. B. C.	Hæmoglobin.	Viscosity Blood.	$\frac{Hb}{V}$	Viscosity after sponge.	Remarks.
1	4,690,000	4,300	80%	4.8	16.6	5.0	1st week.
2	4,272,000	3,750	76	4.2	18.0	4.4	1st week.
3	4,120,000	5,100	70	4.0	17.5	4.2	2d week.
4	4,310,000	6,200	74	4.4	16.8	4.5	2d week.
5	4,000,000	3,600	69	3.9	17.7	3.9	2d week.
6	4,868,000	7,000	83	4.5	16.2	4.6	2d week.
7	4,236,000	4,600	80	4.1	19.5	4.2	3d week; furunculosis.
8	4,100,000	8,000	75	3.9	18.9	4.1	4th week; phlebitis-relapse
9	4,300,000	6,680	67	4.2	15.9	4.5	3d week
0	3,960,000	7,600	63	3.9	16.1	4.1	3d week; hemorrhage.
1	5,000,000	8,200	89	4.9	18.1	5.0 Tub 80°	1st week; psychosis.
2	4,860,000	4,300	84	4.7	17.8	5.0	2d week.
3	4,730,000	3,980	84	4.7	17.8	4.8	2d week.
4	4,120,000	4,600	82	4.0	20.5	4.4	2d week; bronchitis.
5	3,980,000	3,700	76	4.2	18.0	4.3	1st week; bronchitis.
6	4,980,000	5,100	91	5.0	18.2	5.0	2d week.
7	4,530,000	5,420	88	4.5	19.5	4.9	2d week; phimosis.
8	4,420,000	6,200	83	4.3	19.3	4.5	2d week.
9	4,500,000	6,700	81	4.5	18.0	4.7	2d week.
0	4,720,000	6,300	86	4.8	17.9	4.9	2d week.
1	4,930,000	3,570	89	5.0	17.8		3d week.
2	4,460,000	4,680	80	4.5	17.7		3d week.
3	4,570,000	4,000	83	4.3	19.3		3d week.
4	5,080,000	6,600	95	5.0	19.0		1st week.
5	4,000,000	7,400	79	4.0	19.7		2d week.
6	4,800,000	9,000	86	4.6	18.7		3d week.
7	4,880,000	8,300	90	4.9	18.4		3d week.
8	4,240,000	6,700	82	4.1	20.0		3d week.
9	4,590,000	5,900	86	4.2	20.4		3d week.
0	4,780,000	7,100	83	4.5	18.4		3d week; cholecystitis.
1	4,630,000	8,500	85	4.5	18.8		3d week.
2	4,690,000	11,100	83	4.0	20.7		3d week.
3	4,760,000	10,300	81	4.1	19.7		3d week.
4	4,511,000	9,700	79	3.9	20.2		4th week.
5	4,316,000	8,800	79	4.0	19.7		4th week.
6	4,920,000	6,900	84	4.4	19.0		4th week.
7	4,130,000	7,600	80	4.0	20.0		4th week; relapse.
	3,895,000	8,040	76	4.0	19.0		4th week; hemorrhage 12th day.
	5,400,000	3,750	92	4.2	21.9		4th week; well.
	4,540,000	6,000	80	4.2	19.0		4th week; well.
	4,290,000	5,700	77	3.8	20.2		4th week; well.
	4,730,000	10,000	87	4.3	20.2		4th week; well.
	3,960,000	4,600	74	3.8	19.5		4th week; epistaxis.
	3,820,000	4,900	76	3.8	20.0		4th week; emaciated.
	5,000,000	6,800	93	4.6	20.2		4th week; well.
	5,130,000	3,200	93	5.0	18.6		6th week; well.
	4,660,000	4,980	88	4.8	18.3		6th week; well.
	4,620,000	6,600	87	4.5	19.3		5th week; well.
	3,980,000	7,300	84	4.0	21.0		8th week; well; perforation.
	4,320,000	4,160	74	4.3	17.2		7th week; cholecystitis; well.

rom these data the following conclusions may be drawn:

. Typhoid fever produces no characteristic change in the osity of the blood.

. The lowered values noted during the course of the disease h later gradual restitution to normal as convalescence proses, is parallel to the development of anæmia and the subent regeneration of the blood.

. The hæmoglobin—viscosity quotient $\left(\frac{Hb}{V}\right.$, which Bachmann (*l. c.*) has shown to be increased in this disease, varies considerably, and in the majority of instances is subnormal, in one patient being as low as 16.0 (normal=20). This author had found a high quotient in 10 out of the series of 11 cases, and having noted a subnormal quotient in pneumonia, stated that—"these few observations show that a differential diagnosis between these diseases can readily be made by a comparison of their quotients." In this we do not concur.

4. Cold sponges or tubs, whether followed by a good reaction or by cold and shivering, cause an elevation of viscosity. This is in agreement with the observations of Determann (*l. c.*[3]).

5. The restricted diets—consisting of milk, albumen and mush—apparently have no marked effect on the viscosity of the blood.

6. The leucopenia is apparently of no importance in this connection.

II. Pneumonia.

In pneumonia the occurrence of marked salt retention and of cyanosis would, other things being equal, lead to increased viscosity of the blood. Leucocytosis is rarely so marked as to enter into consideration as a factor.

Remarks.	R. B. C.	W. B. C.	Hæmoglobin.	Viscosity.	$\frac{Hb}{V}$
Crisis. Rt. lung	4,240,000	19,240	71%	4.3	16.5
Crisis. Rt. lower lobe......	4,900,000	26,000	78	4.6	16.9
Rt. lung. Empyema	5,220,000	42,000	96	5.5	17.4
Lt. lung. Empyema	5,010,000	32,000	93	5.1	18.2
Rt. lung and Lt. lower lobe......	5,100,000	20,000	90	5.2	17.2
Both upper lobes	4,600,000	16,400	80	4.9	16.3
Lysis. Rt. lower lobe.....	4,720,000	12,300	78	4.8	16.3
Crisis. Rt. lower lobe.....	4,490,000	14,300	72	4.6	15.6
Crisis. Rt. upper lobe.....	4,700,000	10,200	76	4.9	15.9
Both lower lobes	5,000,000	19,300	84	5.2	15.4
Rt. upper lobe pleural effusion ...	5,600,000	22,200	96	5.9	16.3
Rt. lower and middle and Lt. lower lobes.	3,900,000	11,600	65	4.7	17.8
Lysis. Rt. lower lobe	5,430,000	13,400	94	6.0	15.6
Both lower and Rt. upper lobes	3,800,000	18,300	67	3.9	16.0
Lysis. Rt. upper lobe......	4,750,000	28,000	75	4.9	15.3
Crisis. Lt. lower lobe.....	4,240,000	21,000	72	4.0	18.0
Crisis. Rt. lower lobe......	4,160,000	16,000	72	4.3	16.7
Lysis. Rt. lower lobe.....	3,920,000	14,600	66	4.0	16.5
Crisis. Rt. lung	4,804,000	17,100	82	5.0	16.4
Crisis. Rt. lower lobe......	4,920,000	12,000	88	4.7	18.6

Thirteen of the cases showed increased viscosity of the blood and in all the hæmoglobin-viscosity quotient was diminished. The latter finding is more constant than in typhoid fever, but from it no safe inference can be drawn.

III. Malarial Fever.

No.	R. B. C.	W. B. C.	Hæmoglobin.	Viscosity.	
				Blood.	Plasma.
1	3,800,000	5500	65%	3.9	2.1
2	4,300,000	6400	80	4.4	1.9
3	4,700,000	5900	82	4.9	2.4
4	4,100,000	7900	74	4.2	2.2
5	3,900,000	8100	68	5.0	2.0
6	4,520,000	6800	72	4.3	1.8
7	4,600,000	5200	76	4.5	1.9
8	4,200,000	4900	70	5.2	2.0
9	4,900,000	5900	85	4.5	2.0
10	4,700,000	7300	81	4.6	1.9

Here there is either normal or subnormal viscosity of the blood, and normal or hypernormal viscosity of the plasma. The lowered readings for the blood where present, are probably due to the anæmia, and the high readings in three of the cases may find an explanation in the increased volume of the infected erythrocytes. The high viscosity of the plasma may be the result of hæmoglobinæmia present in these cases.

CONCLUSIONS.

The viscosity of the blood and of the plasma is reduced in anæmias, either primary or secondary. With regeneration of the blood, normal values are restored. In leukæmia there is hypoviscosity of the blood with hyperviscosity of the plasma. Leucocythæmia may explain the hyperviscosity of the blood, which is found in a few cases.

The viscosity of the blood and of the plasma is increased in polycythæmia.

Hypoviscosity of the blood and hyperviscosity of the plasma is almost constant in cases of nephritis; the former due to the anæmia, the latter to retained products of metabolism. Though in many instances hypoviscosity occurs in cases with hypertension, this interrelation is often absent.

In cardiac disease without œdema, no constant change is the viscosity is to be found, the coefficient apparently varying with the anæmia and the carbon dioxide content of the blood. In cases with hydræmia, there is hypoviscosity of the plasma.

In diabetes mellitus, the viscosity of the blood and of the plasma is increased, in many cases probably the result of concentration of the blood due to polyuria, of hyperglycæmia and of lipæmia.

In icterus there is generally increased viscosity of the blood and in the plasma, probably the result of cholæmia.

In typhoid fever the viscosity varies with anæmia, is increased by hydrotherapy, and apparently is uninfluenced by diet. The $\left(\frac{Hb}{V}\right)$ quotient is more often decreased than increased.

In pneumonia the viscosity is generally above normal due to cyanosis and salt retention. Here, too, the $\left(\frac{Hb}{V}\right)$ quotient is low.

In malarial fever the viscosity of the blood is usually normal or subnormal, rarely above normal. The viscosity of the plasma is normal or increased, the last as a result of hæmoglobinæmia.

In no disease studied could a pathognomonic alteration in the viscosity of the blood be demonstrated.

BIBLIOGRAPHY.

1. Determann: Ztschr. f. klin. Med., 1910, LXX, 185.
2. Hess: München. med. Wchnschr., 1907, LIV, 1590.
3. Determann: München. med. Wchnschr., 1906, LIII, 905.
4. Hess: Deutsches Arch. f. klin. Med., 1908, XCIV, 404.
5. Bence: Ztschr. f. klin. Med., 1906, LVIII, 203.
6. Rotky: Ztschr. f. Heilkunde, 1907, XXVIII, 106.
7. Hirsch u. Beck: Deutsches Arch. f. klin. Med., 1901, LXIX, 503.
8. Determann: Ztschr. f. klin. Med., 1906, LIX, 283.
9. Kottmann: Cor. Bl. f. schweiz. Aerzte, 1907, XXXVII, 97.
10. Robert-Tissot: Folia Hæmatologica, 1907, IV, 499.
11. Adam: Ztschr. f. klin. Med., 1909, LXVIII, 177.
12. Burton-Opitz: Am. Med., 1907, n. s. II, 179.
13. Burton-Opitz: Arch. f. Physiol., 1900, LXXXII, 447.
14. Müller & Inada: Deutsche med. Wchnschr., 1904, XXX, 1754.
15. Koryani & Bence: Pflügers Arch. f. Physiol., CX, 513.
16. Hamburger: Quoted by Adam, see 11.
17. Limbeck: Arch. f. exper. Path. u. Pharmakol., XXX, 509.
18. Burton-Opitz: Proc. Soc. Exper. Biol. & Med., 1906, n. s. IV, 103.
19. Bachmann: Deutsches Arch. f. klin. Med., 1908, XCIV, 409.

SARCOMA AND TUBERCULOSIS.

REPORT OF A CASE.

By J. P. Simonds, M. D.,

Superintendent, Laboratory of Bacteriology and Pathology, Indiana State Board of Health, Indianapolis.

Rokitansky,[1] in 1846, declared that tuberculosis and car- oma are very infrequently found occurring in the same ient. He even believed the two conditions were almost ompatible, and tabulated his reasons for this opinion. A years later, Lebert[2] disputed Rokitansky's statement be- ise he found 15 cases of tuberculosis among 173 patients h carcinoma. He believed that a patient with cancer could tract tuberculosis as well as any one else, but considered the urrence of carcinoma in the progress of tuberculosis rare.

These observations stimulated the reporting of cases of cinoma associated with tuberculosis, so that to-day the lit- ture on that subject is quite abundant. The association of coma with active tuberculosis seems to have been observed y much less frequently. An examination of the post mortem ords of about 2500 cases of sarcoma of various organs col- ed from the literature yielded 19 which showed this com- ation. In about 100 other cases the tuberculous process not active.

The cases found in the literature may be grouped in three sses. In the first, the tumor and tuberculosis are primary the same organ in which the two processes may be either arate or intermingled. Secondly, sarcoma and tuberculosis primary in adjacent organs and the tumor may or may not w into the one with tuberculosis. In the third group the ons are primary in remote organs and there may or may be sarcoma metastases in the tuberculous organ.

Iildebrand[3] and Schick[4] each reported cases of primary oma of the lung associated with pulmonary tuberculosis. the former's case the two processes were intermingled. nent[5] observed an endothelioma of the parotid gland and entire region of the lower jaw with a focus of tuberculosis the center of the tumor. In two cases of lymphosarcoma he intestine reported by Störck[6] and Franco,[7] the tumor tuberculosis were intimately associated. Freudweiler[8] d tuberculous caseation and lymphosarcoma in the same h gland removed at operation. Mueller and Ricker[9] re- d a small sarcoma from a breast. Later two nodules ared in the scar, one sarcomatous the other tuberculous. fer[10] excised an epithelioma which had developed on a lesion, and a mixed spindle-giant-celled sarcoma de- ed in the scar.

Pulmonary tuberculosis associated with sarcoma of the mediastinum has been observed by Harris,[11] Fowler and Godlee,[12] and Bushnell and Broadbent.[13] In Harris' case the tumor also involved the left lung. Ricker[14] reported a lymphosarcoma of the cervical glands with tuberculosis of the adjacent lymph nodes. An endothelioma of the pia arachnoid of the lumbar cord with tuberculosis of the lumbar vertebræ was reported by Dufour.[15] Bobbio[16] described a spindle-celled sarcoma following three operations on a fistula caused by a tuberculous scapula.

Retroperitoneal sarcomas associated with tuberculosis of the lungs have been reported by Phillipson[17] and McCallum.[18] In the latter's case there were metastases in the lungs. Jscovesco[19] reported a case of tuberculosis of both lungs with sarcoma nodules on the pleura. The site of the primary tumor was not stated. Lazarus-Barlow,[20] in 121 cases of sarcoma, found two associated with active pulmonary tuberculosis. The primary tumor in one case was an endothelioma of the tongue with no metastases; in the other, a round-celled sarcoma of the ischiorectal fossa with metastases in the lungs and other organs.

In addition to the above 19 cases, Rapok[21] has analyzed 141 sarcomas operated on at the Strassburg Surgical Clinic. Among them he found 15 cases associated with tuberculosis. There were 669 tumors of all kinds treated during the same period and 66 of the patients also had tuberculosis. In Rapok's series, the percentage of patients with sarcoma showing tuberculosis was a little higher than the average for all tumors.

Bang[22] analyzed all the cases with tuberculous lesions that came to post mortem at the Commune Hospital in Copenhagen in the 10 years from 1886 to 1895. During this period 6006 autopsies were done and of these 2340 showed tuberculosis in various stages in some part of the body. He found 54 true sarcomas and 34 brain tumors (some of which were probably sarcomas), with which some tuberculous lesion was associated. But in no case was the tuberculosis active.

The following case was first seen by the author at the autopsy table. For the clinical history he is indebted to the house physicians of the St. Louis City Hospital:

The patient was a negress about 60 years old. The family and personal history were negative. When admitted to the

---

hrbuch der allgemeinen Pathologie, Wien, 1846, Erste Auflage, S. 424, u. 552.

chow's Arch., 1852, IV, 214.

ug.-Diss., Marburg, 1887.

ug.-Diss., Greifswald, 1890.

rue de la tuberculose, 1895, III, 134; quoted by Franco, l. c.

ungsberichte der k. k. Gesellschaft der Aerzte in Wien, Abs. in Lubarsch and Oestertag's Ergebnisse, 1898, V. 214.

chow's Arch., 1908, CXCIII, 377.

ted by Franco, l. c.

ted by Franco, l. c.

chow's Arch., 1898, supplement to Bd. CLI, 272.

[11] St. Bartholomew Hosp. Rep., 1892, XXVIII, 87.

[12] Diseases of the Throat and Chest, London, 1898, p. 684.

[13] Jour. Path. and Bact., 1909, XIII, 204.

[14] Quoted by Franco, l. c.

[15] Quoted by Franco, l. c.

[16] Giornal della R. accad. di Med. de Torino, 1906, XII, Series 4, p. 452.

[17] Lancet, 1885, I, 937.

[18] Trans. Assoc. Amer. Physicians, 1907, XXII, 391.

[19] Quoted by Franco, l. c.

[20] Arch. Middlesex Hosp., 1904, II, 224, and 1906, VII, 17.

[21] Deutsche Zeitschr. f. Chirurg., 1889-90, XXX, 465.

[22] S. Bang, Tuberkulosins Sammentraef med forskellige andre Sygdomme belyst ved 6006 Sektionsfund, Copenhagen, 1901.

hospital, November 20, 1907, she was emaciated almost to the last extreme. Her temperature was normal, pulse 70, and respiration 26.

The present trouble began two months before admission, when she first noticed a swelling in the epigastrium. It seemed as if food would not pass this point. She lost weight rapidly from the first. About two weeks after she first noticed the swelling, she vomited twice in one day, the first time, a large amount of greenish material, and a few hours later, almost pure blood. She had not vomited since that time. Ascites developed, and during the last seven weeks, she had been tapped three times.

On physical examination, the sclera were white. The heart and lungs showed nothing abnormal. A hard, irregular mass was felt in the epigastrium, being especially prominent to the right of the middle line. What was thought to be the spleen, could be palpated two inches below the costal border in the left anterior axillary line. The abdomen contained much free fluid, which, together with the extreme weakness of the patient, and marked abdominal tenderness, rendered thorough physical examination impossible. The urine contained a trace of albumin, but otherwise showed nothing abnormal. Blood examination revealed a leucocytosis of 34,000 of which 90 per cent were polymorphonuclears, 3,500,000 red cells, and 56 per cent hemoglobin.

The case was diagnosed carcinoma of the stomach.

Patient died on the eighth day after entering the hospital.

The post mortem examination was made about three hours after death.

Anatomical diagnosis: Retroperitoneal sarcoma; tuberculosis of the peritoneum and retroperitoneal lymph glands; chronic aortic endocarditis; atheroma of the aorta; chronic interstitial nephritis; miliary tubercules in the kidneys; atrophy of the spleen.

The body is that of a very old negro woman. Emaciation is extreme. Over the coccyx is a bed sore 1 cm. in diameter. The inguinal glands and one left supraclavicular gland are palpable.

The peritoneal cavity contains 2500 cc. of yellowish, slightly turbid fluid. The great omentum is short, rolled up and adherent throughout most of its length to the descending colon. The diaphragm is partially adherent to the anterior surface of the right lobe of the liver. Adhesions are present between the tip of the left lobe of the liver and spleen. Similar adhesions between subdiaphragmatic peritoneum and spleen enclose a multilocular cavity containing fluid similar to that in the general peritoneal cavity.

The visceral and parietal peritoneum are thickly studded with semi-translucent nodules (tubercles) miliary in size and larger, many of which are confluent. They are most numerous posteriorly between the lower border of the ribs and the crest of the ilium, and in the pelvis. Here the peritoneum is deeply congested. Thin velamentous adhesions stretch from the uterus to the adjoining structures, forming a complete roof over the cul-de-sac of Douglas. These nodules are fewest in number on the posterior surface of the stomach.

Three large tumor masses are visible on opening the peritoneal cavity. The first projects beyond the anterior border of the liver immediately to the right of the gall bladder; the second has grown between the stomach and the transverse colon; and the third projects from under the left costal border in the mammillary line. These masses are parts of a large irregular growth from the posterior abdominal wall between the liver and the root of the mesentery. Superiorly, it is attached to the gall bladder, and to the posterior part of the inferior surface of the liver to the left of the gall bladder. Posteriorly, the tumor lies in direct relation with the right kidney, vena cava, aorta, renal vessels, adrenals and left kidney, being adherent to the latter over the medial half of its anterior surface. On the left, it is adherent to the spleen, diaphragm and splenic flexure of the colon. Immediately inferior to it are the transverse colon, root of the mesentery, and duodeno-jejunal flexure. The transverse colon has been pushed downward in the middle line, but passes upward to the left of the mass in direct contact with, and adherent to, the descending colon to form the splenic flexure which is thus made a very sharp angle. The duodenum passes around the right border of the mass and, in its lower part, by turning backward and downward comes to lie somewhat between the growth and the right kidney. Anteriorly the central portion of the tumor is covered by the stomach, a small part of the duodenum, the gastro-colic omentum and the pancreas.

The pancreas has been pushed forward and upward so that it is no longer in direct relation with either the duodenum, portal vein or spleen. The head lies over the right margin of the growth and measures 2 cm. in its thickest part. The body and tail are stretched upward and to the left over the most prominent part of the growth. The pancreas is definitely separated from the tumor by a capsule.

On cut surface the appearance varies in different parts of the mass. That nearer the spinal column is firmer in consistency than the more superficial part. The color varies from pale yellowish-white to red and purple. Hemorrhages into the tumor are numerous especially in the left half of the mass immediately beneath the peritoneum. The tumor tissue is everywhere soft and friable; in the superficial hemorrhagic areas it is semi-fluid.

Several important structures lie well within the mass. The branches of the cœliac axis are surrounded by tumor tissue, especially the splenic and hepatic arteries. These vessels stand open on section. The course of the portal vein is tortuous and it is separated from the head of the pancreas by tumor tissue 1 cm. in thickness. The common bile duct is completely surrounded but is patent and bile is easily pressed from the gall bladder into the duodenum.

There is some thickening of the mitral valve. The attached borders of the aortic cusps are calcified and the cusps themselves thickened. In the coronary arteries are numerous atheromatous plaques. The thoracic and abdominal aorta and the common iliac arteries contain numerous atheromatous plaques.

In the apex of the lower lobe of the left lung is a pin-head-sed partially calcified nodule. The anterior borders are nphysematous. Otherwise the lungs show nothing noteorthy.

The palpable, left supraclavicular gland contains several iliary yellowish-white nodules. The tracheo-bronchial glands e anthracotic and very slightly enlarged. Lying posterior to e œsophagus 2 cm. above the diaphragm, is a gland the size a small almond, which, on cut surface, shows a soft, white tinctly limited area 3 mm. in diameter. The spleen is rophied and its capsule covered with tags of adhesions.

The gastric mucosa is covered with thick blood-stained ucus. In the middle third, especially on the posterior wall, e a dozen or so pin-head-sized ulcers, each containing a small ood clot and extending 1 to 2 mm. into the mucosa. The ntents of the intestines are blood tinged in the upper part d black and tarry in the region of the ileocœcal valve and low. Sixty-five centimeters below the duodeno-jejunal flexe, in the attached border of the intestine and extending into e mesentery is a mass 6.5 x 2.5 x 4 cm. It is firmly attached the wall of the intestine and cannot be peeled off from it. ne mass is soft, yellowish-white on cut surface, is very iable and contains two small irregular cavities containing crotic material.

In the liver are a number of metastases from 0.5 to 1 cm. diameter. The gall bladder contains dark green bile and merous soft, small, black stones.

On cut surface both kidneys are red in color, the cortex easures 3 to 5 mm. in thickness and the cortical markings e indistinct. The capsule strips easily, leaving a finely anular surface. On the posterior surface of the left kidney ere is one, of the right kidney two pin-head-sized, yellowishiite, opaque nodules. The interior of the urinary bladder is rmal in appearance.

In the right ovary there is a small cyst 1.5 cm. in diameter, ıtaining clear fluid. The left ovary is atrophied. The llopian tubes are normal except for the tubercles on their itoneal surface. The uterus is small and its walls contain nerous small interstitial fibroids. The peritoneal surface is kly covered with confluent tubercles. The cervix shows results of a lateral tear. No evidence of primary tuberısis of the genitalia can be discovered.

The organs of the neck and the brain were not removed.)

icroscopical examination shows the large retroperitoneal or to be a typical spindle-celled sarcoma. The tumor mass he insertion of the mesentery to the small intestine is lar in every respect to the larger growth. Sections cut to mine the relation of the smaller tumor to the wall of the tine show that in the peripheral part both muscular layers ate the sarcoma from the submucosa. Toward the center ongitudinal muscle fibers, and still further on the circular , completely disappear and the tumor is separated from ubmucous layer only by a thin capsule. The muscular s not involved in the neoplasm. It has the appearance ving been bevelled off from without inward toward the ucosa and is always separated from the tumor by a thin le.

The small nodules in the peritoneum are characteristic tubercules. Many of the sections from the peripheral part of the large retroperitoneal tumor show a narrow rim of lymphatic tissue. In this zone numerous tuberculous foci are found with areas of necrosis and giant cells. The tuberculosis seems to be limited to the remaining retroperitoneal lymphatic structures. In no section has the sarcoma tissue itself been found infected. In the postœsophageal gland, in addition to the metastatic sarcoma, there are two or three very small foci of tuberculosis, but the two processes are always separated. The supraclavicular gland contains tubercules.

Tubercle bacilli were found in a number of sections cut so as to include the zone of lymphatic tissue on the surface of the large retroperitoneal growth.

The chief interest of this case lies in the association of a very rapidly growing retroperitoneal sarcoma with a very virulent tuberculous infection of the peritoneum. It was not possible to determine which condition appeared earliest. The fresh appearance of the tubercules and the exceedingly rapid growth of the sarcoma make it probable that both processes began about the same time. No source of origin of the tuberculous peritonitis could be found although searched for diligently. There were no tuberculous ulcers in the intestine, and the only tuberculosis of the genital organs was on their peritoneal surfaces. The fact that tubercles were more numerous and more often confluent in the pelvic peritoneum may have been due to the effect of gravity in causing the infected peritoneal fluid to collect there.

Of the above 130 cases,[23] tuberculosis was active in 34. Of the 20 cases (including the one here reported) in which sufficient data were given to permit their use in an analysis, tubercle bacilli were actually demonstrated in only 9 and not mentioned in 11. This is an important desideratum since Baty-Shaw[24] has reported a case of sarcoma of the mediastinum associated with pseudo-tuberculosis of the left lung. Grossly, the lesion in the lung closely resembled true tuberculosis, but the bacilli could not be found either in the contents of the cavities nor in sections of the lung.

That sarcoma and tuberculosis are rarely found in the same patient is an admitted fact, but that there is anything incompatible in the two conditions does not appear probable. The case here reported of a very virulent form of both diseases in the same patient would seem to be sufficient to preclude their being incompatible. There is no apparent reason why a tuberculous process should, by chronic irritation, cause the development of a sarcoma, although the cases of Bobbio and Tauffer rather remotely suggest such a possibility. Both of these cases had been operated upon two or more times previous to the appearance of the tumor. Taylor and Teacher[25] have reported cases in which a cancer appeared to cause the development of a sarcoma in the adjacent connective tissue. On the other hand, the general debility and consequent loss of resisting power which accompanies the growth of a sarcoma would prepare the soil for an infection with tuberculosis.

---

[23] If we exclude Bang's 34 cases of brain tumor, some of which were undoubtedly not sarcomatous, the total will be 96 instead of 130.

[24] Brit. Med. Jour., 1901, 1, 1331.

[25] Jour. Path. and Bact., 1909, XIV, 205.

The following are suggested as possible reasons why the two lesions are not more frequently found associated: (1) The age incidence of the two diseases is not quite the same. Sarcoma and tuberculosis affect all ages, but the former is more frequent before 20 and the latter after that age. (2) The rapidly fatal course of a sarcoma may attract attention to itself so completely that the presence of a mild tuberculosis would not be recognized clinically.

CARCINOMA OF THE RIGHT FALLOPIAN TUBE READILY PALPABLE THROUGH THE ABDOMEN.

By Thomas S. Cullen, M. B.,
Associate Professor of Gynecology, Johns Hopkins University.

Cancer forms a very small percentage of the pathological conditions of the Fallopian tube. As pointed out by Hurdon,[1] carcinoma was noted only three times in the tube, as compared with some four hundred cases of cancer of the uterus that came under our observation in the Johns Hopkins Hospital. Among the more important American articles on this subject are those of LeCount[2] and Hurdon.[3] In the Johns Hopkins Bulletin of 1905, Vol. XVI, p. 399, I reported a case of adeno-carcinoma of the tube in which as a result of extensive involvement of the pelvic peritoneum and of the surrounding tissues I found it necessary to remove not only the entire uterus with the adnexa but also several inches of the sigmoid flexure and about one-third of the pelvic peritoneum.

Alban Doran,[4] of London, has given a complete survey of the literature and collected in all sixty-two cases. A further admirable monograph on the same subject by the same author[5] appeared a few months ago. In this the number of cases of carcinoma of the tube had been increased to one hundred.

After such thorough presentations of the subjects as have been furnished by these authorities a further survey of the literature would be simply a repetition and I shall merely report a case which came under my observation in the laboratory. Its chief interest lies in the large size of the growth. When I first saw the hardened specimen before learning the clinical history, I considered it to be a very large hydrosalpinx or pyosalpinx. On section, however, its true character was readily discernible.

Adeno-carcinoma of the right Fallopian Tube, extension to left Fallopian Tube; very small uterus.

San. No. 2453.—Mrs. M. H., aged 46. Admitted to Dr. Kelly's private sanitarium on May 14, 1907. The patient entered complaining of a mass and great pain in the lower part of the abdomen. The family and past history were negative.

The menses began at 14, were regular, moderate in amount, somewhat painful and usually lasted four days. For the last two or three months the periods have been irregular but profuse. She had one miscarriage when 18. Recently there has been a profuse leucorrhœal discharge which, for the past year, has been associated with some odor and with blood.

Present Illness.—Two years ago the patient first had what she called an attack of appendicitis. The pain was located in the right iliac fossa and was severe and cramp-like in character. It has persisted in this region and for the last year has also been present in the left side. The pain radiates into the leg and for the last four or five months both legs have been swollen.

Operation.—The uterus was removed by bi-section; a small piece of intestine was also removed on account of a little subperitoneal cyst which was supposed to be secondary to the tubal growth. There was no glandular involvement and no evidence of any peritoneal implantation.

Path. No. 11536. The specimen consists of a small uterus, of a greatly enlarged right Fallopian tube and of an enlarged left Fallopian tube.

The body of the uterus is 4 cm. long and about 4 cm. broad. It is markedly atrophied. The right tube at the uterus is about 7 mm. in diameter, but after passing outward 1 cm. it curves on itself, becomes markedly convoluted and 5 cm. from the uterus is 5 cm. in diameter. It continues to increase in size until at its outer end it is 10 cm. in diameter. Roughly it forms a sausage-like tumor 14 cm. long, 12 cm. broad, and about 10 cm. in thickness. Anteriorly it is covered with adhesions. Posteriorly it is perfectly smooth and springing from its surface is a subperitoneal cyst 1.5 cm. in diameter. Large congeries of blood vessels are seen ramifying beneath the peritoneum.

On section it is seen that the great increase in size is due in a large measure to a new growth. This has extended into the lumen of the tube, but at no point does it appear to have reached the outer surface. Where the tube is 5 cm. in diameter the growth completely fills the lumen. It is composed of a granular-looking new growth which presents a somewhat arborescent appearance. The growth apparently springs from all parts of the wall of the tube. Near the fimbriated extremity, where the tube is 10 cm. in diameter, for over fully half of its extent the walls are covered with a new growth. This in places reaches 2 cm. in thickness. At other points the tube seems to be free from the growth. The entire central portion of the tube has been filled with fluid that has undergone coagulation in the hardening fluid. In the fluid next the growth here and there are large blood clots. The gross picture leaves little doubt that we are dealing with a malignant growth. If it be malignant the reason why it has not extended outside seems evident, because the point of least resistance would be toward the center of the tube.

---

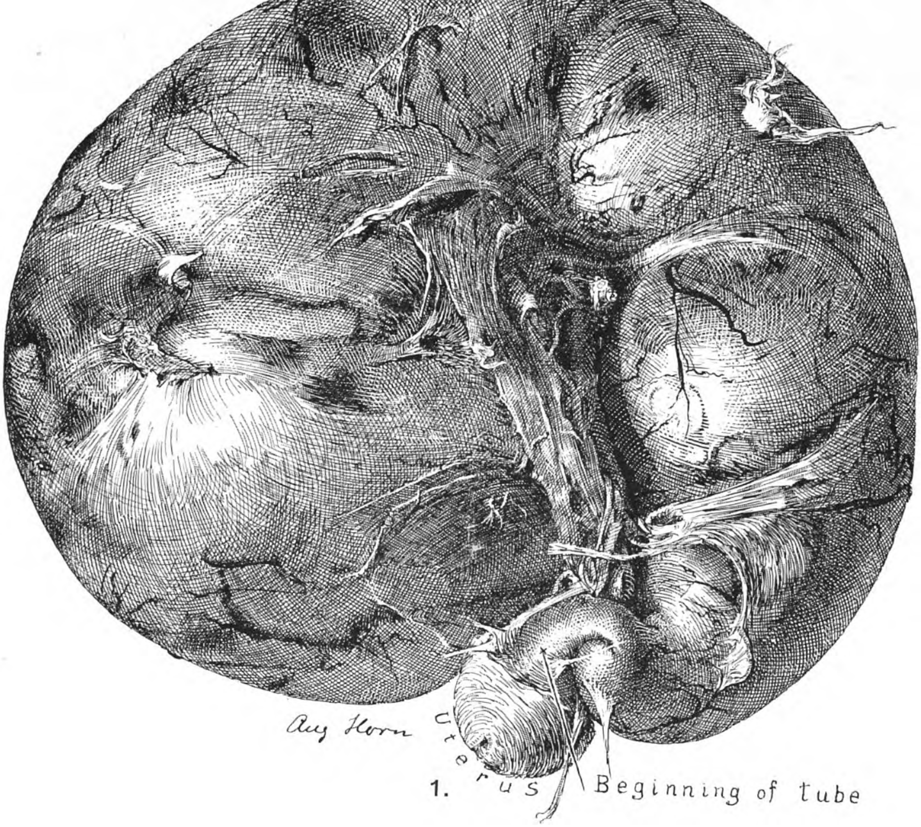
[1] Elizabeth Hurdon, Kelly, H. A., and Noble, C. P. Gynecology and Abdominal Surgery, Phila., 1907-08, I, 175.

[2] LeCount. Johns Hopkins Hosp. Bull., 1901, Vol. XII, p. 55.

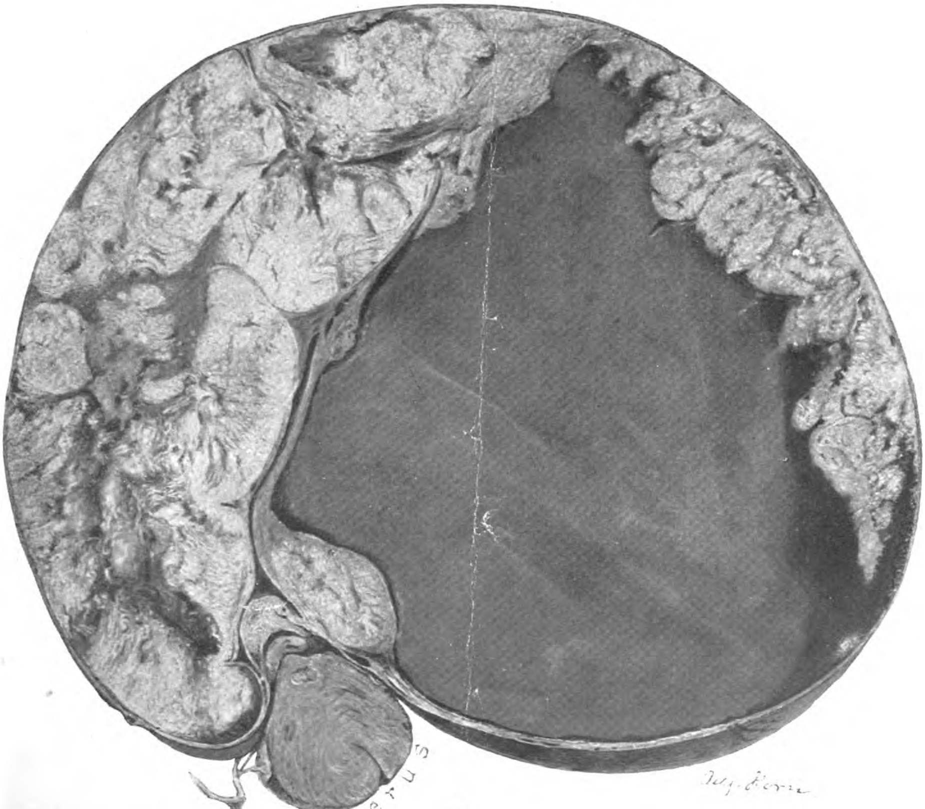
[3] Elizabeth Hurdon. Johns Hopkins Hosp. Bull., 1901, Vol. XII, p. 315.

[4] Alban Doran. J. Obst. & Gynæc. Brit. Emp., Lond., 1904, VI, 285.

[5] Alban Doran. J. Obst. & Gynæc. Brit. Emp., Lond., 1910, XVII, 1.



1.



2.

tube, near the uterus, is 5 mm. in diameter, but on
utward a short distance it is dilated to 4 or 5 cm. It
n section is found to be the seat of a similar growth.
is covered with adhesions.

ical Examination.—Sections from the growth of the
show in some areas little tree-like or teat-like projec-
nding into the cavity. They remind one very much of
folds noted where a hydrosalpinx exists. At other
epithelium has proliferated forming gland-like areas.
dvanced portions over wide areas papillary outgrowths
These present a distinct arborescent appearance and
tions are covered with one or several layers of very
ingly regular cylindrical epithelium. Over large areas
ot the slightest evidence of breaking down. In still
ions of the growth one sees nuclei two or three times
size. These stain somewhat deeply. In other portions
longitudinal sections of finger-like processes with large
els in their interior are seen. Here and there the
proliferated until solid masses of glands have been
Masses of epithelium without evidence of gland forma-
lso noted. In only a few places is there evidence of
own.

wth is, without doubt, a carcinoma, but is characterized
ed tendency toward gland formation and papillary out-
nd by its stability instead of its tendency toward break-
One might, with some propriety, claim that it re-
o a marked degree, a very cellular and branching

eresting to note that the other tube presents a similar
. One tube may have picked the carcinoma up from the
e tube walls themselves are not over 1 mm. in thickness. We did not receive the ovaries or the small nodule from the bowel for examination.

We find no record of any other carcinomatous tube that has reached such large proportions.

Post-Operative History.—Sept. 30, 1910. Dr. Curtis F. Burnam kindly made inquiry concerning the patient and finds that there is at present a marked recurrence of the growth, there being a large palpable abdominal mass. The patient, however, is able to do her work most of the time and her general health has been but little affected.

The growth has evidently been a rather slow one as it is nearly three years and a half since operation.

DESCRIPTION OF FIGURES.

FIG. 1.—Primary Carcinoma of the Fallopian Tube. (Natural size.)

The small uterus has been bisected and one-half is seen in the lower part of the picture. The tube at the cornu is small, but after passing outward a short distance rapidly increases in size. Its outer end is so much distended that it might readily be mistaken for an ovarian cyst. The surface of the tube is covered by numerous adhesions and its vessels are large and tortuous. The interior of the tube is shown in Fig. 2.

FIG. 2.—Primary Carcinoma of the Fallopian Tube. (Natural size.)

For the general contour see Fig. 1. In the lower part of the picture is a cross section of half of a bisected uterus. The great increase in size of the tube is in a large measure due to a friable, stringy growth which almost completely fills the lumen. The great distension of the outer end of the tube has been caused by an accumulation of serous fluid which has coagulated in the hardening fluid. This coagulum is seen retracting from the tube wall and could readily be lifted out of the tube in one piece. It will be noted that where the tube is so much dilated its walls over a considerable area are totally devoid of new growth.

IN MEMORIAM.

AUGUST HORN.

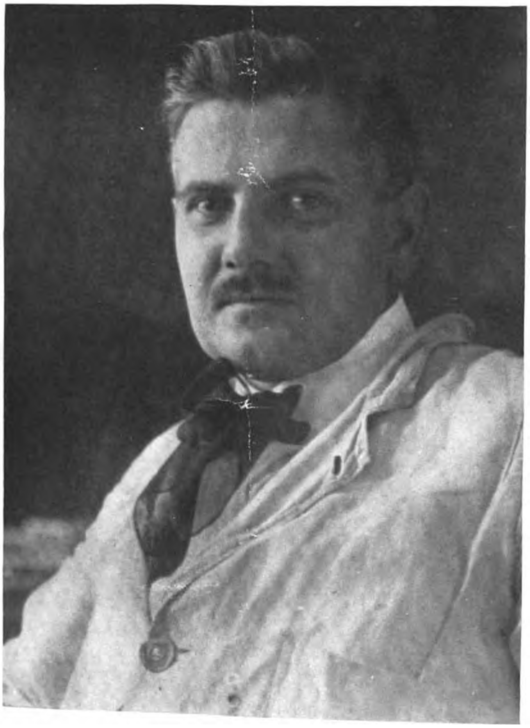
ust 19, 1910, our friend and associate, August Horn,
nly in Bad Nauheim, where he had gone in quest
He had been ill for nearly a year with post-typhoid
s and many of the distressing secondary affections
this disease. He was buried in Leipzig-Mockau,
nvalid father and mother still live. He was an only
de of humble parents.

rtistic ability asserted itself early, and in 1884 at
5 years, he entered the “ Königliche Kunstakademie
gewerbeschule ” in Leipzig, where he devoted his
study of the fine arts and, as it was customary in
in Leipzig's academy, he also took up one of the
, viz., lithography. This was done to assure himself
od in case his talent should prove insufficient for
k. This step I consider fortunate as will appear
as always very conscientious and came to excel in
h required a combination of artistic feeling with a
f technical skill. On the other hand, in the study
y and science underlying art, Horn showed less
But his instinct usually supplied what his mind
and so well did he observe and analyze that he
in his work the lack of theoretical study.

rative narrowness of artistic ideals in Leipzig
to become a student in Munich, where he painted for a number of years under several well-known masters. Through his colleagues he became known to wealthy art connoisseurs, and since the life of a poor artist, in a center like Munich, is one of great deprivations, he turned aside, temporarily at least, to become a copyist. He was sent to Dresden, Venice, Milan, Rome and other places with orders to copy famous works of the old masters. These copies were exceedingly well done, faithful even to the technical peculiarities characteristic of each master.

Such was his work when I visited Leipzig in 1898. Having been requested to suggest an artist for Dr. Halsted and his department, if one such could be found, I at once thought of Horn and induced him to give up his work in Italy and become a medical illustrator. He began his work here as illustrator in the surgical service of the hospital in the fall of 1898, and soon demonstrated that his ability was equal to his task. His faithful water color paintings of tumors of the breast and similar drawings are unique and only paralleled by the best French pictures of pathological subjects. In 1901, Horn became a member of Dr. Kelly's staff of artists. His drawings for the “ Vermiform Appendix ” and “ Medical Gynecology ” are too well known to require any praise. Later he was engaged jointly by Drs. Kelly and Cullen, for whom he did most of the illustrations of the books “ Myomata of the Uterus ” and “ Adenomyoma of the Uterus.” His last work, just begun, was intended to illustrate a book on diseases of the ovary by Dr. Cullen. Many articles in medical journals by Drs. Halstead, Cullen, MacCallum, Hunner, Watts, Holden and others were illustrated by Mr. Horn, all with great zeal, fidelity and feeling for the artistic possibilities of a supposedly dry subject. To him all things in nature were capable of displaying beauty; he felt its presence, hunted for it, and brought it out in all his drawings with unerring instinct.

Horn's best work was done in the realistic style. There he was a master. In other respects, however, he may have had some deficiencies. He never liked to make diagrams or work out a problem; he also could not draw a picture intended to represent the salient features of a case or of a group of cases. He could not visualize nor generalize, perhaps because his knowledge of medicine as a science was small. He was not a student and his storehouse of anatomical information was limited. Therefore he rarely had a clear mental picture before he began his diagram. He then began to experiment, alter, and usually ended up with a mediocre picture and his spirit downcast. But if given the opportunity of sketching an operation or of drawing a specimen at his leisure, he was in his element; his eye and hand worked together with splendid precision. He knew how to find the inherent beauty of a line or contour, how to illuminate an object so as to produce a perfect symphony of tints and gradations of tones, which fused together so harmoniously that even the dullest object became interesting if pictured by him. With it all he was ever true and faithful in his interpretation of form so that also in regard to scientific accuracy his medical drawings bear close scrutiny. This is a splendid combination and American medical literature is fortunate to have had an artist of Horn's type contribute to its pages.



AUGUST HORN.

Horn's success is, I think, capable of some analysis. His art training was almost identical with that of a number of the best medical illustrators of to-day, viz., Heroux, Unger, the two Keilitz, Kirchner, Becker and others. They were all Leipzig men, brought up in an art school, where drawing and painting were supplemented by splendid training in the graphic arts (lithography, wood engraving, etching, engraving on copper, etc.). In this manner there was acquired, besides a solid draughtsmanship equal to that of many well-known painters, a perfect technique requisite to representations of minute and exact conditions as demanded in medical work. When they chose medical work as their profession they realized that they had to begin to study once more, for while their artistic skill was perhaps equal to the task of a portrait, a landscape, or a composition, they knew little of medicine. The study of medicine from the standpoint of the medical illustrator was tedious work, there being no instructor to guide them. Each was his own teacher and each developed his own style in conception and execution. All of them have achieved a notable success, a success which, though reached in various ways, had, underlying it, a common training which laid stress on accuracy and technical efficiency. I am convinced that this technical efficiency was greatly aided by practise in the graphic arts, by the painstaking attention to detail learned, for instance, in the work of engraving. I mention this again only because it appears that the medical illustrators of the future could with the greatest advantage be recruited from the ranks of art students, who have had a similar training. Certain it is that technical efficiency is demanded more and more in the medical illustrations of to-day. Twenty years ago the original of a medical drawing was often sketchy in character, even careless in technique. The artist usually depended on the wood engraver, lithographer, or etcher to redraw his original and, in doing so, to give it the exquisite finish which we admire so much in the medical works of a generation ago. To-day the cheaper photomechanic processes have supplanted the engraver and the illustration once made is final. The process, however, is sure to bring out all the technical shortcomings of the original with faithful regularity even accentuating their ugliness and it is apparent that a greater technical skill than ever before is demanded of the artist.

August Horn was 41 years of age when he died. The last twelve years of his life, his best years, were given to medicine. He was a serious minded man and his sincere manner and conscientious attitude toward his fellowmen made him much beloved by all who came in contact with him. He had few outside interests, for his whole soul was centered in his work. His untimely death is indeed a serious loss to the art of medical illustration, since a large part of the work done in this line displays the immature efforts of men or women, who have not had the necessary training for such difficult drawing.

Max Brödel.

NOTES AND NEWS.

recent meeting of the Congress of American Physicians
geons held in Washington in May, 1910, a joint session
American Orthopedic and American Pediatric Societies
and the subject of epidemic poliomyelitis was discussed.
wing resolution was adopted:

ving been shown by recent epidemics and investigations
l with the same that epidemic infantile spinal paralysis
ectious communicable disease that has a mortality of
20 per cent, and that 75 per cent, or more of the patients
are permanently crippled, State boards of health and
lth authorities are urged to adopt the same or similar
as are already adopted and enforced in Massachusetts
aining the modes of origin and manner of distribution
ease with a view of controlling and limiting the spread
us an affection."

ittee with Dr. Robert W. Lovett, president, Boston,
Irving M. Snow, secretary, Buffalo, N. Y., was appointed
e various State and municipal health authorities to
e work of investigation of the various foci of epidemic
is, to study its epidemiology and to instruct the pub-
disease is at least mildly communicable.

PERSONAL.

k C. Beall is Professor of Anatomy, Fort Worth Uni-
th Worth, Texas.

M. Berry is Radiographer and Orthopedic Surgeon,
pital. His address is 2 Chestnut Street, Albany, N. Y.

tes Block is Professor of Nervous and Mental Diseases
ta College of Physicians and Surgeons, and its Visit-
n to the Piedmont Sanitarium, St. Joseph's Infirmary
byterian Hospital.

Blumer is Dean of the Yale Medical School, Physi-
New Haven Hospital and the New Haven Dispensary,
the Connecticut Society of Mental Hygiene and Chair-
Section of Medicine, American Medical Association.

. Branch is Resident Physician and Superintendent,
ospital, Macon, Ga.

. Caulk is one of the Genito-Urinary Surgeons on
he Washington University, St. Louis. His address
Building, St. Louis, Mo.

unningham is Instructor in Clinical Medicine, Los
cal Department, University of California.

avidson is Pathologist to the Seattle City Hospital,
and has charge of the Dispensary of the City Hos-
dress is Empire Building, Seattle, Wash.

C. Dickson is Assistant Professor of Pathology,
rd, Jr. University, Fellow of the Rockefeller Insti-
al Research, and Assistant Pathologist to the Lane
he City and County Hospital, San Francisco. His
California Street, San Francisco, Cal.

Erlanger is Professor of Physiology, Washington
ical School. His address is Forest Park Building,

W. Farr is Physician to the Leamy Home. His
tnut Hill, Philadelphia, Pa.

Feurbringer is Assistant, Surgical Clinic, Uni-
urg, Germany.

lsborough is Professor of Obstetrics, University of
tending Gynecologist and Assistant Obstetrician
General Hospital. His address is 459 Franklin
N. Y.

Dr. Frederick M. Hanes is Associate in Pathology, College of Physicians and Surgeons, New York. His address is 437 W. 39th Street, New York City.

Dr. August Hoch is Professor of Psychiatry, Cornell University Medical College and Director Psychiatric Institute of the New York State Hospitals.

Dr. Campbell P. Howard is Professor of Theory and Practice of Medicine, State University of Iowa, and Physician to the University Hospital. His address is Iowa City, Iowa.

Dr. Charles R. Kingsley's address is West New Brighton, Staten Island, N. Y.

Dr. J. D. Madison is Attending Physician to the Milwaukee County Hospital and to the Johnson Emergency Hospital, Milwaukee, Wis.

Dr. Harry T. Marshall is Professor of Pathology and Bacteriology at the University of Virginia.

Dr. E. M. Mason's address is Birmingham, Ala.

Dr. Adolf Meyer is Psychiatrist to the Johns Hopkins Hospital. His address is 1035 N. Calvert Street.

Dr. Charles Wilson Mills is Assistant Physician, Loomis Sanatorium, Loomis, N. Y.

Dr. Charles F. Nassau is Assistant Professor of Surgery, Jefferson Medical College, Assistant Surgeon, Jefferson Medical College Hospital, Surgeon to St. Joseph's Hospital and Consulting Surgeon to the Frankford Hospital.

Dr. E. L. Opie is Professor of Pathology, Washington University Medical School, St. Louis, Mo.

Dr. Jewett V. Reed is Assistant Professor of Surgery in the Indiana University School of Medicine, Superintendent of the Indianapolis City Dispensary, Secretary of the Executive Board of the Indiana University School of Medicine, and Visiting Surgeon at the City Hospital.

Dr. E. H. Richardson's address is 216 E. Preston Street.

Dr. Stephen Rushmore is Instructor in Clinical Gynecology, Tufts College Medical School, Visiting Gynecologist, Carney Hospital and Assistant Visiting Physician to the Obstetrical Department, Mt. Sinai Hospital, Boston, Mass.

Dr. Glanville Y. Rusk is Assistant Professor of Pathology, University of California. His address is Berkeley, Cal.

Dr. W. W. Russell is Gynecologist at the Union Protestant Infirmary, the Church Home and Infirmary and the Women's Hospital of Maryland.

Dr. William F. Shallenberger is Resident Surgeon to the Women's Hospital of Maryland, Baltimore.

Dr. Charles J. Spratt's address is Reid Corner, 900 Nicollet Avenue, Minneapolis, Minn.

Dr. Roland L. Stacy's address is Ogdensburg, N. Y.

Dr. A. Raymond Stevens is Adjunct Assistant Attending Genito-Urinary Surgeon to Bellevue Hospital. His address is 40 East 41st Street, New York City.

Dr. Harvey B. Stone's address is 213 E. Preston Street, Baltimore, Md.

Dr. Henry C. Thacher is Assistant in Medicine at the College of Physicians and Surgeons, New York. His address is 20 West 50th Street, New York City.

Dr. Louis W. Warfield is Assistant Professor of Medicine, Wisconsin College of Physicians and Surgeons, and Assistant Superintendent and Resident Physician, Milwaukee County Hospital. Address: Wauwatosa, Wis.

Dr. Percy T. Watson's address is Fenchow, Shansi, China, where he is stationed as a medical missionary.

Dr. Harry I. Wiel is Assistant in Medicine in Charge of Tuberculosis Class, San Francisco Polyclinic.

Dr. Otis B. Wight is Lecturer in Gynecology, University of Oregon, and Clinical Assistant in Surgery, Free Dispensary, Portland, Oregon.

Dr. J. Whitridge Williams is Honorary President of the Glasgow Obstetrical Society.

Dr. Paul G. Woolley is Professor of Pathology, University of Cincinnati College of Medicine, Dean of the Medical Faculty and Director of the Laboratories of the Cincinnati Hospital.

NOTES ON NEW BOOKS.

Diseases of the Heart and Aorta. By A. D. Hirschfelder, M. D. 632 pages. (*J. B. Lippincott Company, 1910.*)

The past few years have witnessed an unusual activity in the clinical study of abnormal cardiac conditions. Instruments of precision such as the sphygmomanometer, the polygraph, the electrocardiograph, and the orthodiagraph have furnished data that have added much to our knowledge and have corrected or confirmed opinions that were otherwise impossible of scientific demonstration. This new knowledge has rendered obsolete many of the older text-books. It is a pleasure, therefore, to find in Dr. Hirschfelder's book a careful and critical review of this new material and an attempt to combine it with the older cardiac pathology. In addition to this the relation of clinical conditions to those which are observed in the physiologic laboratory is discussed by one whose original researches on the pathologic physiology of the heart makes his opinion of unusual interest.

The first third of the book deals with the general principles of cardiac physiology, pathology, methods of examination, and therapeutic measures. The conventional anatomic introduction is replaced by a physiologic introduction and throughout this part of the book the physiologic point of view is evident; noticeably in the discussion of the arterial and venous pulses, the effect of exercise, and the action of drugs. The latter two-thirds of the book deals with the various diseases of the heart. The division of diseases is made on the anatomic basis so far as possible. Interesting chapters are introduced on vasomotor crises and angioneurotic lesions, on angina pectoris, on the heart in pregnancy and labor, on heart-block and the Adams-Stokes syndrome, on paroxysmal tachycardia, and on the heart in disturbances of the thyroid. It is to be regretted that the author has not given separate consideration to the common and important changes associated with continuous high blood pressure, with its distinct clinical picture and special dangers. The chapter on the so-called cardiac neuroses is short and indicates the unsatisfactory character of our knowledge of these conditions.

The book is illustrated with numerous photographs, X-ray pictures, drawings, and illustrative case histories. The majority of these are original and highly valuable in rendering more easy an understanding of the subject matter. Each chapter is followed by a full bibliography which adds greatly to its reference value.

On the whole, the book may be regarded as the best that we have in English on this subject. The discussions are often of a theoretical character, too technical perhaps for a general practitioner, but to one who has followed the many recent advances in our knowledge of diseases of the heart, they are instructive and stimulating.

A. W. H.

Fiske Fund Prize Dissertation, No. LIII. The Classification and Treatment of Diseases Commonly Known as Rheumatism. By Frank E. Peckham, M. D. (*Providence: Snow and Farnham Company, 1910.*)

We welcome anything which throws light on the obscure problems of arthritis, but it cannot in honesty be said that this work lessens the darkness. The conditions "known as rheumatism" are classified by the writer as "villous arthritis, atrophic arthritis, hypertrophic arthritis, infectious arthritis and gout." The writer opens with the statement that "A classification must be founded on some logical basis, ..." with which we all agree. But should villous arthritis then be regarded as a special form? Is it not a change which occurs with various joint disturbances and which has in no respect a specific character? For example villous arthritis may occur with traumatic arthritis, with tuberculous arthritis or with what is termed arthritis deformans. Then again when one form is classified on an etiological basis, e. g. infectious arthritis and another on an anatomical basis, e. g. hypertrophic arthritis, can we be regarded as proceeding on a logical basis? The objection is also made stronger by the fact that there is good proof that many of the cases of hypertrophic arthritis are secondary to an infection. The term infectious arthritis—would not *infective* arthritis be a better designation—is used to-day in a very loose way. It would be wiser if we restricted it to those forms of arthritis in which the bacterial origin is definitely proved; as for example, tuberculous or gonorrhœal arthritis.

Much of the treatment advised for these conditions is to be commended, particularly the emphasis which is placed on the uselessness of calling many forms of arthritis rheumatism and directing treatment, especially by drugs of the salicylate class, to that supposed disorder. There are not many who will agree with the author as to the results to be expected from electrical treatment. The man who believes enthusiastically in this is to be envied; the influence of his belief is probably more important that the electricity itself.

Golden Rules of Refraction. By Ernest E. Maddox, M. D., F. R. C. S. Ed. "Golden Rule" Series, No. XII. Third Edition. Revised. Price 1s. (*Bristol: John Wright and Sons, Ltd.*)

What was said of this work in this journal in May, 1903, holds true of it to-day. In very small compass it holds much useful information for students beginning the study of refraction, but we cannot recommend such condensed food as a nutritious diet.

Messrs. Lea & Febiger (Philadelphia and New York) have issued a convenient pocket-sized Practitioners' Visiting-List for 1911. In the diary there is space for recording visits to thirty patients per week. For quick reference there are numerous tables which are useful to the practitioner in his daily work, and also rules for aid in surgical and medical emergencies. It is neatly printed and bound. Price $1.25.

Chronicles of Pharmacy. By A. C. Wootton. Two vols. (*London: Macmillan & Co., 1910.*)

A study of the "chronicles of pharmacy" is likely to lead one into many interesting by-paths and side excursions. Pharmacy, as we know it to-day, can hardly be regarded as other than a prosaic matter, but in its long history it has come through many varied experiences. As the author of this work well states it has been associated "with magic, with theology, with alchemy, conscious fraud, with the strangest fancies, and ogmas and delusions, and with the severest science." The list those who have contributed to pharmacy is a long one. From pollo and Chiron the Centaur to Thomas Dover the Buccaneer, e have all sorts and conditions of men.

This work has evidently been a labor of love and bears the arks of having been in preparation for many years. It would difficult to write such a work in any brief time for the great riety of information must have been obtained from many urces and demanded long and patient search. A pathetic feat e was the death of the author while the work was going rough the press. In the preface he asks for corrections, which adds, with prophetic voice, he may not have the opportunity utilizing.

There is so much of interest in the volumes that it is not easy choose what should be specially noticed. In the discussion of armacy in early times, the myths of the ancients, pharmacy nong the Pharaohs, in the Bible, and of the Arabians are dealt th. Of the remedies in use at the time of Hippocrates it is orthy of note that among a list of one hundred and ninety-five ugs, thirty-four are still in use in ordinary medicine and some hers are domestic remedies. There is an interesting chapter on e Arabian school of medicine and pharmacy, especially in re rd to its influence on European knowledge.

The account of pharmacy in Great Britain has many interesting ints and of course describes the great battle over the dis nsaries between the physicians and apothecaries. One does not onder at the protest against the apothecaries when some of the nounts charged for medicines in those days are quoted. The apters on Magic and Medicine, and Dogmas and Delusions are ll of interesting matter and perhaps none is more so than the count of the so-called sympathetic remedies. The most often oted example is Sir Kenelm Digby's "power of sympathy," but did not originate the idea. Pliny had the germ of it when he vised that if one should be sorry for a blow given, if he spit to the middle of his hand, "the party that was smitten shall esently be free from pain." Paracelsus was a strong advocate the value of a sympathetic ointment which was to be applied the weapon which had given the wound, but he threw out an chor by saying that it was not of value if an artery was severed the brain, heart or liver was injured. Robert Fludd, the sicrucian, was a warm advocate of the sympathetic ointment, l Madame de Sévigné was another firm believer in this principle treatment. It is, however, with the name of Digby, that the ne of the power of sympathy is especially associated. The pters on Masters in Pharmacy and Royal and Noble Phar cists contain references to many interesting characters and ir contributions to pharmacy. Sir Walter Raleigh's Cordial Bishop Berkeley's Tar Water receive due mention. Under contributions from chemistry comes the history of many of modern agents. Many details are given in reference to the overy of the action of the metals which form so important a of our materia medica to-day.

he second volume has perhaps even more varied discussions. use of animals or parts of them in pharmacy makes rather essing reading, sometimes also amusing. A cure for drunken- has certainly something to recommend it: "Eels being put wine or beer and suffered to die in it; he that drinks it will r endure that sort of liquor again." The chapters on some d Drugs, Familiar Medicines and Noted Nostrums are full teresting points. We are to-day returning to the use of cuanha as a remedy for dysentery. This was the disease which it was employed when introduced into Europe from by a Portuguese friar in 1625. It was brought specially to by Helvetius who cured the son of Louis XIV of dysentery use. Many old favorites are discussed, "Dover's powder," gory's powder," "Plummer's pills," "Friar's Balsam," etc. Chapters on Persons in History, Pharmacy in the Nineteenth Century, and Names and Symbols conclude the work.

We can very heartily recommend these volumes to all who are interested in the history of medicine, but it is difficult to imagine that anyone could fail to find something which would repay the reading of them. It is to be regretted that the author did not live to see his work published. He has given us an excellent addition to the historical part of our libraries.

Rational Hydrotherapy. A Manual of the Physiological and Therapeutic Effects of Hydriatic Procedures and the Technique of Their Application in the Treatment of Disease. By J. H. Kellogg, M. D., etc. Illustrated. Fourth Revised Edition. (*Philadelphia: F. A. Davis Company, Publishers, 1910.*)

Those who desire a large treatise on hydrotherapy will do well to purchase this volume, for they will find the subject treated lucidly and in great detail. The author in his preface states that "while water is recognized as without doubt one of the most valuable of all natural agencies, the writer has never permitted himself to be classed with those enthusiasts who place their trust in it as an exclusive measure. It is best employed in connection with the use of electricity, massage, and medical gymnastics. Rational diet is as essential in the treatment of the majority of cases of acute and chronic disease as is water. In the treatment of chronic disorders the regulation of exercise, dress, and of other habits of life is also a matter of paramount importance; also the disuse of tea, coffee, tobacco, and alcoholic beverages, which are often found to sustain a very direct causative relation to the patients' maladies, and are without doubt responsible for many failures in which the fault has been unjustly charged to the inefficiency of water as a therapeutic agent." This work, of over 1200 pages, is divided into 4 parts. Part I contains 6 chapters: Historical; The Physics of Water, Air, Heat and Light in Relation to Hydrotherapy; Anatomy and Physiology in Relation to Hydrotherapy; The Physiological Effects of External and Internal Applications of Water; the Physiological Effects of Friction or Mechanical Irritation of the Skin; and The Physiological Effects of Light. Part II is in 4 chapters: The General Principles of Hydriatics; The Therapeutic Effects of Hydriatic Applications; General Rules, Principles and Suggestions Relating to the Practical Employment of Hydrotherapy; Hydriatic Institutions and Their Equipment, and the General Management of Cases. Part III has but 1 chapter: The Technique of Hydrotherapy, and Part IV has 4: Hydriatic Prescription Making; Summary of Experimental Work; Hydriatic Measures for Regulating Blood Pressure; and Recent Advances in Hydrotherapy. There is also a very full bibliography and index. After a careful study of this work any doctor should have an intelligent knowledge of the value, uses, and methods of hydrotherapy.

The Surgery of Childhood, Including Orthopædic Surgery. By DeForest Willard, M. D., Professor of Orthopædic Surgery, University of Pennsylvania. With 712 illustrations, including 17 in colors. Price $7. (*Philadelphia and London: J. B. Lippincott Company, 1910.*)

The volume is dedicated to the late D. Hayes Agnew, M. D., LL. D. The author says that one of the principal objects of the book is to induce the earlier examination and recognition of the surgical diseases of childhood, since irreparable damage frequently follows through delay in investigation or treatment by the attending physician or surgeon. The importance of the clinical examination of each patient is emphasized, but in addition he urges the systematic use of accurate and scientific methods of investigation by instruments of precision. He has endeavored to select and present methods of diagnosis and treatment that in his long experience have proved to be of practical service.

The book is divided into thirty chapters, as follows: I, General Surgical Considerations; II, Surgery of the Head and Face; III, Surgery of the Neck and Chest; IV, Surgery of the Abdomen; V, Surgery of the Genito-Urinary Organs; VI, Burns, Frost-Bites, Boils; VII, Orthopædic Surgery; VIII, Fixation Dressings and Splints; IX, Rotary Lateral Curvature of the Spine; X, Constitutional Diseases Productive of Deformities; XI, Fractures in Children; XII, Tuberculosis of Bones and Joints; XIII, Spinal Caries, Tuberculous; XIV, Spine, Various Surgical Conditions; XV, Pelvis; XVI, Hip-Joint Disease, Tuberculous; XVII, Hip, Various Surgical Conditions; XVIII, Knee-Joint, Tuberculosis; XIX, Knee, Various Surgical Conditions; XX, Ankle and Foot Injuries; XXI, Surgical Conditions of the Shoulder; XXII, Surgical Conditions of the Elbow-Joint; XXIII, Surgical Conditions of the Wrist and Hand; XXIV, Non-Tuberculous Diseases of the Joints; XXV, Non-Tuberculous Bone Diseases; XXVI, Paralysis; XXVII, Talipes; XXVIII, Various Deformities of the Feet; XXIX, Congenital Malformations and Dislocations; XXX, Congenital Deficiencies of Bones.

It is interesting to note that the author advocates nitrous oxide as the ideal anesthetic for short operations on children. This is somewhat at variance with the reports of other authors.

He emphasizes the great importance of economizing the body heat in children by wrapping all portions of the body, outside of the operative area, in cotton covered with wax paper; by the use of electrically heated or hot water operating pads, and by non-exposure of surface before, during and after operation.

There are many references throughout the book, a number of them being from the author's writings, and in addition at the end of the book there is a bibliographical appendix of four pages containing a complete list of his numerous publications.

The illustrations are plentiful and for the most part good, although some, especially those showing instruments, are too small to be of any use.

The book is well written and will be especially interesting to those who have had the privilege of attending Dr. Willard's clinics, and will serve as a very useful and practical reminder of this distinguished surgeon.

J. S. D.

A System of Syphilis in Six Volumes. Edited by D'Arcy Power, M. B. Oxon., F. R. C. S., and J. Keogh Murphy, M. C. Cantab., F. R. C. S. With an introduction by Sir Jonathan Hutchinson, F. R. S. Vols. V and VI. Price of each $13.50. (*London: Henry Frowde and Hodder & Stoughton, 1910.*) *Oxford Medical Publications.*

The fifth volume contains paper on "The Affections of the Skin in Syphilis," "Ocular Syphilis," "Naval Syphilis," and "Syphilis in the Upper-Air Passages," and the sixth volume completes this system with a series of papers devoted to a history of this disease "in the more important armies," to various aspects of syphilis in the navy of the United States of America, and the Royal Navy. To this volume also there is prefixed a brief introduction by one of the editors, Dr. Murphy, and the last paper in it is one on "The Value of Justus' Test in the Diagnosis of Syphilis." In both these volumes there are numerous excellent photographs and colored plates. Taken as a whole, it is the most complete System of Syphilis in the English language, and an excellent one. Were it not for the price of the individual volumes it would have a larger sale. The last volume, with a large amount of statistics bearing on this disease as it has appeared in different armies and navies at varying epochs and in many localities is a most interesting one to public health officers and sanitarians, as well as physicians. In the Editors' Afterword occur these sentences which will define the character of the work: "Attention has been called by some of our critics to the amount of repetition in the work when considered as a whole. This appeared to the Editors to be unavoidable, as it was necessary to make each volume as far as possible complete in itself; moreover each article represents the individual and mature judgment of its author, which has sometimes differed from that of other eminent authorities whose conclusions had already been given." Such frankness disarms the critic. He may not agree with the individual writer on many points, but he must not forget that the author is a man of large experience expressing his mature judgment. On "Syphilis," there is probably more disagreement among physicians than on any other disease, due to its proteid form, and great local and individual differences in its severity. If Ehrlich's "606" proves as valuable as is now hoped it will, much of the treatment advocated in this volume will be antiquated in a few years, but the System will still remain a notable one, most valuable to all syphilographers.

A Treatise on Diseases of the Eye. By John Elmer Weeks, M. D., etc. Illustrated (*New York and Philadelphia: Lea & Febiger, 1910.*)

This is a thoroughly satisfactory text-book on the Diseases of the Eye. Throughout it shows that the author has very carefully planned a text-book based on his own personal experience and knowledge, without using any existing text-book as a model. The author has been thoroughly alive to the fact that there have been many valuable and important contributions to ophthalmological literature in recent years, and he has judiciously incorporated this material into the text—the result being a new and thoroughly modern text-book, showing a forceful individuality.

All pathological and bacteriological matter pertaining to Eye Diseases has been most fully and carefully considered, and in such a manner as to show that the author is not only an ophthalmologist, but a real pathologist as well.

We commend this book to all students. We believe that Weeks has produced the best American text-book on the eye written up to the present time—a book which is in the same class as the German "Fuchs," which is equivalent to saying, without further commendation, that it is an extraordinarily excellent text-book on Eye Diseases.

B. B. Browne, Jr.

Refraction and Motility of the Eye. With Chapters of Color Blindness and the Field of Vision. Designed for Students and Practitioners. By Ellice M. Alger, M. D., etc. Illustrated. Price $1.50. (*Philadelphia: F. A. Davis Company, 1910.*)

This book was a distinct disappointment to the reviewer. A modern text-book setting forth the methods and practices of the present-day oculist used in correcting the refraction-errors of the eye would be a welcome addition to the many very excellent text-books on the Diseases of the Eye which we have. This book, in the main, only states the familiar optical laws found in most text-books. A considerable amount of irrelevant subject matter helps to increase the size of the volume, while much material, which ought to be found in its pages is either omitted or dismissed in a few words. Sufficient attention is not given to the various astigmatic tests, nor to the make up of trial cards, their illumination, etc. The book contains many devitalized facts, in the main correctly stated, but it would not be possible to acquire valuable and comprehensive knowledge of practical refraction from its pages, and we do not believe that it satisfactorily meets the needs of any class of readers.

B. B. Browne, Jr.

Pathogenic Micro-Organisms, Including Bacteria and Protozoa. By William Hallock Park, M. D., and Anna W. Williams, M. D. Fourth edition, enlarged and thoroughly revised. (*Philadelphia: Lea and Febiger, 1910.*)

We have previously had the opportunity of calling attention to the excellent text-book on Pathogenic Bacteria and Protozoa by Park and Williams. The present edition deserves no less praise

predecessors can be especially
:d to physicians who are interested in public health

ods of bacteriological diagnosis employed at the Re-
ratory of the Board of Health of New York City form
the book, although the methods employed in other
are by no means neglected. The chapters on Tuber-
ıtheria, and Typhoid Fever are especially to be praised
nclude not only excellent descriptions of the cultural
cs of the organisms concerned in these infections,
ny of the investigations in the field of Immunity and
apy, which have resulted from the bacteriological
se diseases. The other pathogenic bacteria are well
d the methods for the isolation of the various micro-
oncerned in Human Pathology are clearly and ac-
en. There are, however, certain features of the book
the standpoint of the teaching bacteriologists, are to
.

verage student it seems as if too much attention has
d to certain organisms and too little space given
iption of other no less important pathogenic bacteria.
hapters on Tuberculosis and on Diphtheria occupy
ıges each, and that on the Typhoid Bacillus, nearly
hile the description of the Gonococcus and its char-
limited to 7 pages, that of the Meningococcus to a
and the Plague Bacillus receives an inadequate de-
nfined to 4 pages. For the student of Bacteriology
organisms are quite as important as the former.

methods in which organisms are grouped are also
h criticism, and it is difficult to see exactly the reason
bacteria are included in the same chapters. Thus
cus of Malta Fever and the Micrococcus Zymogenes of
nd Hastings are placed in the chapter with the Gono-
the Bacillus of Soft Chancre, an arrangement for
is no justification, either from the cultural char-
f the organisms, or from their pathogenic action.
Bacillus is grouped with the pathogenic anærobes,
ntial differences in the methods which must be em-
ıe cultivation of these various organisms are not
ht out. The attempt has also been made to classify
nisms derived mainly from the intestinal tract ac-
eir cultural characters, regardless of certain well-
hological distinctions and a hopeless mix-up has re-
encapsulated bacteria which form a distinct group of
ns are placed with *Bacillus coli*, *Bacillus typhosus*,
para-typhosus, and with them is included the micro-
swine plague with entirely different cultural char-
This latter organism indeed should be the type
the hemorrhagic septicæmia group in which the
several infections of man, although the resemblance
ses and the microörganisms thus far encountered in
ndition of hemorrhagic septicæmia in lower animals
s clearly marked.

is made to apply correct botanical names to the
al species, an unfortunate omission for the student
come strictly under the rules of botanical nomen-
ıen these rules are properly applied with the name
first correctly designating the organism, many of
acts of bacteriology are impressed upon the mind.

are a number of investigations of the first rank
cteriologists which have received scant attention.
Jordan and Harris on Milk Sickness is not in-
investigations of Dorset, Bolton and McBride on
Hog Cholera are not mentioned. The last-named
s now been repeated in many of the bacterio-
ries abroad, the results of these men have been
rmed and this piece of work stands out as one of the finest achievements that has ever been made by bacteriologists in this country.

The book in our estimation contains a large amount of very valuable information, and can be especially recommended to the practicing bacteriologist. The faults which we have mentioned are but minor points of arrangement and detract but little from the great value of the work.

The section of the book devoted to Protozoölogy, written separately by Dr. Williams, leaves nothing to be desired in the way of concise, clear description of the protozoa, and like the Bacteriology proper is especially to be praised for the diagnostic methods which it emphasizes.

Report on the Measures Taken Against Malaria in the Lahore (Mian Mir) Cantonment. By The HONORABLE MR. R. NATHAN, C. I. C., I. C. S.; LIEUTENANT-COLONEL H. B. THORNHILL, C. I. C., I. A.; and MAJOR L. ROGERS, M. D., F. R. C. P., F. R. C. S., I. M. S. 1909. (*Calcutta, India: Superintendent Government Printing, 1910.*)

This report is divided into the seven following parts: 1, Preliminary; 2, Description of Lahore Cantonment; 3, First Series of Experimental Operations in Lahore Cantonment; 4, General Anti-Malarial Operations in the Cantonment; 5, Result of General Anti-Malarial Measures; 6, Summary of Conclusions; and 7, Applicability to India of Measures Adopted in Other Parts of the World. To all interested in the problem of the extermination of malaria this is a most valuable report, for in spite of the best efforts of the military officers and physicians, and of admirable work done, it has not been possible to reduce the prevalence of this disease in the Lahore Cantonment. In fact the results are very similar to those that have followed the introduction of the water filtration in Washington, D. C., where though the plant to this end is as good as can be, the diminution in the amount of typhoid fever has not followed as was expected. It merely shows that in all these problems there are many factors which have yet to be carefully studied and worked out.

Naval Hygiene. By JAMES DUNCAN GATEWOOD, M. D. Instructor in Naval Hygiene, U. S. Naval Medical School, Washington. Medical Inspector, U. S. Navy. Illustrated. Price $6. (*Philadelphia: P. Blakiston's Son & Co., 1909.*)

This book on Naval Hygiene, by Dr. Gatewood, is written especially from the standpoint of a medical man occupied with the problems of naval hygiene, and is designed primarily for the students interested in this field of medicine. It cannot be looked upon as a mere record of scientific facts, although a scientific basis for the practical work outlined in this book is clearly indicated.

The book is divided into eight chapters. The first chapter deals with naval vital statistics, and in it the author dwells at length upon the various forms of disease met with in tropical and temperate climates and attempts to show the varied susceptibility or immunity which the enlisted men exhibit towards these diseases. The tables giving the sick rates, death rates, etc., are well arranged and are of great value in the interpretation of vital statistics.

In the second chapter the problem of the ventilation of ships is taken up, and emphasis is laid upon the necessity for a proper ventilation of all the different parts of the vessel. The various methods employed to rid vessels of obnoxious odors and gases are enumerated and the clear distinction between the theoretical ideas of the trained laboratory man concerning ventilation and the practical difficulties encountered on ship board in carrying out these ideas is clearly indicated. In our opinion this chapter is the most interesting and the best written of all the chapters of the book.

The third chapter deals with the problems of light and emphasizes the effect of well-lighted quarters upon the physical and mental health of the enlisted men, and in this chapter the author maintains that gloomy surroundings have a far greater influence upon the health of the men than is generally supposed.

The other chapters of the book deal with such problems as water supplies, drainage, food, clothing and disinfection. In the chapters dealing with disinfection the various methods employed on board ship are given, and the numerous duties of the officers at the recruiting stations are described. The importance of a more stringent examination of the applicants for enlistment at the recruiting stations is indicated, and Dr. Gatewood is inclined to put the responsibility of much of the high sick rate on board ship upon the recruiting officer, believing that many individuals are permitted to enlist, even though they are physically unfit to withstand the routine of ship life.

The book is well written and will, we believe, prove of great value to the student of naval hygiene bringing together most of the important facts and principles to be known in this field. Had the author condensed his material into a smaller volume he would have added greatly to the value of his publication.

Osteology and Syndesmology. By Howard A. Sutton, M. D., etc., and Cecil K. Druker, B. S. Price $1.50. (*Philadelphia: P. Blakiston's Son & Co., 1910.*)

The authors endeavor in this work to present these two subjects in a way to make them more easily learned than they can be in the usual anatomical text-books. "The bones follow one another in the order found simplest and most useful in presenting the course in osteology at the University of Pennsylvania. Summaries occur at the end of every section, which is not a summary in itself. It is hoped they will facilitate review and will be of service in the quizzing of the student with his fellows—a method of work most necessary in such a course. Each joint is discussed after the bones which compose it, instead of in a separate division at the end of the book." These quotations from the preface show the arrangement and purport of the book—a form of quiz compend. Such a work finds a welcome place on the book-shelf of many a student, but it cannot take the place of a more scientific anatomy.

Hernia: Its Cause and Treatment. By R. W. Murray, F. R. C. S., etc., Illustrated. Second Edition. Price 6s. (*London: J. & A. Churchill, 1910.*)

This brief treatise on hernia is merely an exposition of the author's views and practice on the subject—it does not pretend to be more than this. The author believes that inguinal hernia, in the large majority of cases, is due to a sac of congenital origin, which is entirely separate from that which involves the tunica vaginalis, and that this "Saccular Theory" is applicable to all forms of hernia. He has had as good success with his operation as many other surgeons have had with theirs, and it must be left to those interested in hernia to read the book carefully and decide on the relative merits of the operation.

The Hand-Book of Electro-Therapeutics. By William James Dugan, M. D. With ninety-one illustrations. (*Philadelphia: F. A. Davis & Co., 1910.*)

This is a work which deserves special attention from physicians interested in this branch of medicine. It will also richly repay careful study by the general practitioner who, knowing nothing about electricity, ignores its great usefulness in the treatment of a variety of disorders, some of which are very intractable to other means of treatment—for example neuritis.

The book is written in a clear and concise fashion. The different kinds of electric currents and their uses are described at sufficient length for a work which deals with so extensive a subject in so small a compass. A large variety of useful apparatus is amply illustrated.

That treatment by electricity has been greatly abused by the unscrupulous and by those who had little knowledge of physiological or pathological conditions, there can be no doubt.

For instance the author speaks of the extensive use made of the high frequency current in the treatment of hysteria; he points out that it is irrational to use a current which lowers blood pressure in a disease where blood pressure is already below normal instead of using the static current which would tend to reestablish normal arterial tension, without sacrificing any of the psychic effect.

In the treatment of goitres, carcinoma, enlarged prostate and other surgical diseases, the author very properly specifies that electricity should not be used unless a radical operation is for some reason contraindicated, or as an auxiliary after operation to build up the general health of the patient. The chapters on Magnetism, Heat and Light, and Death by Electricity were to the reviewer, particularly interesting and instructive.

By way of criticism the reviewer has nothing to say unless it be to the publisher for the mistake in Fig. 70, between pages 126 and 127, where an "X-ray" plate of an ankle (anterior view) is called a wrist.

The book, taken as a whole, is a very strong plea for the more extended use of electrotherapeutics by members of the profession who, being satisfied that this important agent rests on a firm scientific basis, will use it as such, and not as a mere vehicle for suggestion.

John Sebastien Derr.

Practical Physiological Chemistry. A Book Designed for Use in Courses in Practical Physiological Chemistry in Schools of Medicine and of Science. By Philip B. Hawk, M. D., Ph. D. etc. Third Edition. Revised and Enlarged. Illustrated. Price $2.50. (*Philadelphia: P. Blakiston's Son & Co., 1910.*)

That this book has met with approval is seen by the fact that this edition has followed the second within a year. In its present form certain corrections have been made and "a number of qualitative tests and qualitative methods," that are new, have been added. The work was favorably commented upon in this Journal, December, 1909.

A Treatise on Orthopedic Surgery. By Royal Whitman, M. D. Fourth Edition. Revised and enlarged. Illustrated. (*Philadelphia and New York: Lea & Febiger, 1910.*)

The author states in his preface that "this edition has been thoroughly revised. New material and new illustrations have been added, and in its present form it is believed that the book fairly represents this department of medicine at date of issue." The importance of the illustrations was drawn attention to in the review of this book which appeared in the Bulletin in August, 1907. Its value as a treatise on Orthopædics was noted, and in its present form this work is a most excellent one, and especially serviceable to students from the clearness with which matters are presented, and the authority given it by the author whose work in orthopædics is recognized as preeminent in this country.

Normal Histology with Special Reference to the Structures of the Human Body. By George A. Piersol, M. D., Sc. D., Professor of Anatomy in the University of Pennsylvania. 438 illustrations many of which are in colors. Eighth Edition (rewritten). Price $3.50. (*Philadelphia and London: J. B. Lippincott Company.*)

The author's aim has been, to quote from the preface, "to present descriptions which should include the salient features of the various structures with sufficient fullness to impress important details without wearying minutiæ: too great conciseness, on the of detail, on the other, are :isfactory."

ıctory middle ground has been reached in the clear ə presentation of the essential features of the various . tissues.

ε is adequately illustrated, the excellent figures bear- author's statement that the preparations, from which drawn, were selected to show the usual rather than .l histological appearances.

ıre of the work is the insertion in certain instances of line of the macroscopic features of an organ before the appearances are described.

ε will be especially appreciated by students beginning in Histology, for whom indeed it is primarily intended.

of Physiology With Practical Exercises. By G. N. ɪт, M. A., M. D. Edin., etc., Professor of Experimental ıe in Western Reserve University, Cleveland. With plates and 450 other illustrations. Price $5. Sixth . (*New York: William Wood & Co., 1910.*)

l edition of this work was reviewed in the BULLETIN 99. That three more editions have been called for shows that its merits to which attention was called it a favorite text-book with students. It has grown its years of age, but it has at the same time become ork, and thus its success is well deserved. It is not ɔk to learn from, but the student who has mastered it oughly well grounded in the principles of physiology.

Being the Transactions for the Study of Malaria in Edited by MAJOR S. P. JAMES, M. D., I. M. S. Issued he authority of the Government of India by the Sani- ommissioner with the Government of India, Simla. *Government Central Branch Press, 1910.*)

ıe first number (July, 1910) of a new journal on Palu- issued at "irregular intervals." Special students of l be interested to note its appearance, as there are estions still to be solved in regard to this disease, and ə of the countries which suffers greatly from it, and :hances to study it are especially good. The famous by Ross, in relation to the malarial parasite and its were made in India, and there is little doubt that ɔle information will come from the well-trained Eng- officers in that country. This number contains some Notes on Mosquitoes," and unquestionably this new be required by all those who wish to be masters of

ls of Histology. Descriptive and Practical. For the :udents. By E. A. SCHÄFER, M. D., etc. 8th Edition. 50. (*Philadelphia and New York: Lea & Febiger,*

ɔn varies but little from the seventh which was ticed in our columns, December, 1907. In its new little larger, but this increase in size is due mainly umber of illustrations, many in colors. These make ɒst helpful one to students, and its numerous editions its merit.

ıberculosis and its Complications. By SHERMAN G. ʟ. M., M. D. Second Edition. Price $7 net. (*Phila- W. B. Saunders Company, 1910.*)

tion of this book was reviewed in the BULLETIN of lditional material and chapters increase the already llection of facts. It is to be regretted that data in such profusion as to leave their bearing on the rather indistinct. Not always does the author correlate clearly his large material. In this edition we find the chapter on bacilli resembling the tubercle bacillus, enlarged and admirably improved. In the discussion of the relation between the human and bovine types, Detre's scheme of differential diagnosis is given extended notice without any hint of the serious doubts thrown upon it by various authors. The statement as regards the excessive use of the subcutaneous tuberculin test for diagnosis is to be heartily commended, and deserves wide circulation. But the recommendations as regards the maximum dose to be employed, if the method must be resorted to, are unnecessarily cautious. There is in this chapter, too, an unfortunate confusion in the use of "local" for both "local" and "focal" reaction. In the section on the cutaneous and ophthalmic tests, there is not enough emphasis laid upon the almost utter uselessness for diagnosis in adults of the positive cutaneous reaction, nor is there made clear the importance of observing the percentage strength of the solutions used for the eye tests. That, at present, little help is derived from the Röntgen Ray in early diagnosis, is a justifiable conclusion. The new chapter on the Regulation and Restriction of Travel for Consumptives, shows the growing demands of our social sense. The chapter on Immunity is the least satisfactory. The facts are not well selected, and the discussion not judicious. In spite of the faults cited, the reader will find the book full of most valuable information. S. W.

Hookworm Disease. Etiology, Pathology, Diagnosis, Prognosis, Prophylaxis and Treatment. By GEORGE DOCK, A. M., M. D., Professor of the Theory and Practice of Medicine, Medical Department of Tulane University of Louisiana, New Orleans, and CHARLES C. BASS, M. D., Instructor of Clinical Microscopy and Clinical Medicine, Medical Department of Tulane University of Louisiana, New Orleans. Illustrated with fifty-nine special engravings and colored plates. Price $2.50. (*St. Louis: C. V. Mosly Company, 1910.*)

So much attention has been given to the prevalence of the Hookworm Disease in the South, both by the press at large and the great numbers of articles appearing in the medical journals that we feel sure a treatise on the subject is most opportune.

In a book of 250 pages, Dock and Bass have given an excellent résumé of what is known concerning the Etiology, Pathology, Diagnosis, Prognosis, Prophylaxis and Treatment of this disease. Beginning with a most interesting historical review of the subject we find complete chapters devoted to the geographic distribution and economic importance of the disease, its zoölogic features, pathologic anatomy, and symptomatology; each chapter is replete with illustrations.

To the practicing physician we particularly recommend the chapters devoted to the diagnosis and treatment of the disease. The remarkable results obtained through the use of Thymol makes this drug almost a specific.

While the book has been primarily written for physicians, hygienists, employers of labor, and others interested in sanitation will find valuable information within its covers.

J. S. B.

Progressive Medicine. Edited by HOBART AMORY HARE, M. D., assisted by LEIGHTON F. APPLEMAN, M. D. Vol. III. September, 1910. (*Philadelphia and New York: Lea & Febiger, 1910.*)

The latest and most important papers on "Diseases of the Thorax and its Viscera, including the Heart, Lungs and Blood Vessels," on "Dermatology and Syphilis," on "Obstetrics," and on diseases of the "Nervous System" are reviewed and discussed in this volume. What makes this series valuable is first the selection of the papers out of the immense mass of material constantly appearing; and second, their treatment—their careful grouping, and the broad review of the subject in hand by the editor of the section. The different departments of medicine are well treated, and the busy practitioner can get much help out of these volumes.

International Clinics. Edited by Henry W. Cattell, A. M., M. D. Vol. III. Twentieth Series. (*Philadelphia and London: J. B. Lippincott Company, 1910.*)

Out of the many interesting papers in this volume it is difficult to select one as more worthy than the rest of special notice. There are articles on Diagnosis, Treatment, Teeth and Oral Cavity, Gynæcology, Medicine, Surgery, Miscellany, and A Medical Home-Coming Week, and specialists in any of these departments will find noteworthy contributions to their own line of work. These articles do not appear in other journals, so that this series records a very large number of rare clinical histories.

Diseases of Infancy and Childhood; their Dietetic, Hygienic and Medical Treatment. A Text-book designed for Practitioners and Students in Medicine. By Louis Fischer, M. D., Attending Physician to the Willard Parker and Riverside Hospitals, etc. Third Edition. Illustrated. Price $6.50. (*Philadelphia: F. A. Davis Company, Publishers, 1910.*)

A review of the first edition of this book appeared in the Bulletin two years ago. The issue of the third edition of a work of this magnitude indicates that it has met with gratifying success. In the present issue several new chapters have been added as for example on epidemic cerebro-spinal meningitis and its treatment by the Flexner serum and lumbar puncture, on scabies indicanuria, acetonuria, and diabetes. New illustrations have also been added.

If any criticism of the book as a whole were offered it might justly be said that too much space in it is given to too many subjects. For instance the chapter on the bacteria of the intestines would be equally valuable if the bacteria were described in less detail and the results of more recent investigations had been embodied in it. The same objection might be urged to the account of the bacteriology of diphtheria. This information might have been much abridged without, in any manner, lessening the value of the chapter which is perhaps the strongest in the whole book. These, however, after all are minor defects and the present edition is a valuable manual for the guidance of practitioners who are treating the diseases of infancy and childhood.

A Manual of Hygiene and Sanitation. By Seneca Egbert, A. M., M. D., etc. Fifth Edition. Enlarged and thoroughly revised. Illustrated. Price $2.25. (*Philadelphia and New York: Lea & Febiger, 1910.*)

This excellent manual has a well-deserved popularity. The fourth edition was favorably reviewed in this Journal (December, 1907) and the new edition is an improvement on the last. We again cordially recommend it to all who desire a small work on this subject.

The Essentials of Materia Medica and Therapeutics for Nurses. By John Foote, M. D., Assistant Professor of Therapeutics and Materia Medica, Georgetown University School of Medicine. (*Philadelphia and London: J. B. Lippincott Company, 1910.*)

This volume of about 200 pages is designed, as its title indicates, to furnish a knowledge of the essentials of Materia Medica and Therapeutics. It is the view of the author that text-books on these subjects, written for the use of nurses, have often been too complicated and the task, on the part of the pupil nurse, of selecting the essential knowledge for the performance of the work, has been rendered unnecessarily difficult. The methods given for converting apothecaries' weights and measures into metrical weights and measures are clearly given and ought to relieve the minds of nurses of a serious burden. The descriptions of the actions of drugs and especially of the untoward effects of drugs are clear and terse. The book, as a whole, is a good one and will serve a useful purpose in the instruction of nurses.

Lippincott's New Medical Dictionary. A Vocabulary of the Terms Used in Medicine, and the Allied Sciences with their Pronunciation, Etymology and Signification. Including much Collateral Information of a Descriptive and Encyclopædic Character. By Henry W. Cattell, A. M. (Laf.), M. D. (U. of P.), etc. Freely illustrated with figures in text. Price $5. (*Philadelphia and London: J. B. Lippincott Company.*)

The character of modern dictionaries has very much changed from that of their early predecessors. To-day they are encyclopædic in character, and there is much more information to be found in them. This change, while valuable in many respects, has its dangers as well; the last edition of Webster's "New International Dictionary" is an example both of how a dictionary may be improved, and harmed by adding to it much information which really belongs to an encyclopædia. This new medical dictionary shows the same advantages and disadvantages. Where the simple definition, derivation and use of words are not adhered to, there is no limit to what may be added or left out of a dictionary in the way of information; and so each will vary, depending on the editor. Lippincott's appears to be an excellent book, and if the user will first read the introduction (a task very few users of dictionaries will put themselves to) the use of the dictionary, and its values, will be much more readily comprehended.

Granting that the choice of his material and its use must be left to the editor, yet it may be permitted to make some reflections on certain points.

Why should French words, for instance, be found in an English dictionary? *e. g.*—*sonde*, its English equivalent, is just as good and there is no need to adopt this foreign word; *aï crépitant* is another example, and also *aboiement*.

It seems mere waste of space to name all the varieties of sutures, or to give all the names of different organisms to which syphilis has been attributed under the title Bacillus of Syphilis, since today we know that there is one and only one organism which causes this disease.

Under the headings "regio," "abscess," "hyper," and "malignant" we find all sorts of combinations which any school boy ought to understand without needing to look them up in a dictionary. To omit these would save much space.

Other compound terms like "pin-hole pupil," and "school-made chorea" might, it seems to us, be fitly omitted.

The gold-tail moth, with a reference to the Lancet, is unknown to us, while the brown-tail variety is now known to all the Eastern States and causes a dermatitis. To the latter variety there is no reference. As mere misprints we note under "sweat-fever" its definition anglicus sudor [sic]; under sweating-fever, Anglicus Sudor [sic], and on page 653, under the illustration of opisthotonos, occurs "Grande hysteria" which either should be grand hysteria or *grande hystérie*.

The illustrations are as a whole of almost no value, but otherwise the book, as a piece of book-making, is most satisfactory.

Practical Nursing. For Male Nurses in the R. A. M. C. and Other Forces. By Major E. M. Hassard, R. A. M. C., and A. R. Hassard. Price $1.50. (*London: Henry Frowde and Hodder & Stoughton, 1910.*) *Oxford Medical Publications.*

This book, with slight modifications, could be well used by any army medical corps, whether male or female nurses are employed. It has been carefully prepared and covers the ground satisfactorily. In a later edition, to make the work more generally serviceable, it would be well to omit such terms as "Higginson syringe" or "Neville cradle" as these names mean nothing to the

~~It seems doubtful~~ whether such large doses of brandy, tioned on p. 228, for a child should ever be used, and diphtheria antitoxin for a child is usually less—not "the 287) as for an adult. It is stated (p. 238) that the dressing a case of cancrum oris is allowed to smoke is nauseating. Female nurses do not smoke, and there reason why male nurses should when so occupied. ɔns for counting sponges (p. 200) before and after an ɹre not the best control against leaving one in the cavity. "Practical Nursing" is none the less a thor- l and reliable guide.

k of Pathology. By JOSEPH McFARLAND, M. D., Pro- ɔf Bacteriology and Pathology in the Medico-Chirurgi- llege, Philadelphia, etc. Second Edition. (*Phila- : W. B. Saunders & Co., 1910.*)

ral arrangement of this book corresponds to that of ition. Aside from a differentiation into general and ıology there seems to be very little selection in the subjects especially in the first half of the book. After the pathology of nutrition and circulation in such ɪe could hardly expect to find in a book of this size, gives us a brief description of the cell and its life and by three chapters on Regenerative, Retrogressive and tissue changes. In the first of these the healing of ɹriefly considered, in the second aplasia and hypoplasia ed by pages on infiltrations (fat, glycogen, serum, ɪe—under this, neoplasm—pigment) and degeneration, ɪnchymatous, etc.) from the paragraph on atrophy. ɔwed by necrosis. In the third hypertrophy and tumor ɹre discussed. Such an arrangement marks a radical rom the customary arrangement and without any ex- ote seems to offer no advantages.

nphasized later. Inflammation and repair usually con- ɜther are as we have seen separated. Repair is first under regenerative tissue changes and inflammation precursor of repair only follows hundreds of pages the ambiguous heading of infection and infectious Even allowing this, the chapters on inflammation isappointed for the author devotes pages to the mor- l cultural characteristics of the organisms concerned ess and relatively little to the parts of the subject rally discussed. Throughout the book this portion ɜct is unsatisfactory and cannot compare with such s of the subject as Adami and others offer.

d half of the book on Special Pathology is hardly ctory. Let us analyze the chapter on Diseases of the lar System. Without any preliminary embryological ı the author plunges us into the malformations ɔnly comprehensible from a developmental aspect. follows and the presentation lacks unity and sequence ɜtent that the reader finds himself with a few isolated should be related but are not, and so on through the The fatty heart which on section allows oil drop- ɘ and which imperils the life of the individual, the ɔus myocarditis which results in death from cardiac e myomalacia cordis which the author emphasizes e least rare. The lack of histological description is . In this chapter histological description of an ante- ɪnd its mode of formation is not even hinted at (this ummarily discussed in the discussion of Thrombosis in the General Pathology). This is in strong con- ɔages devoted to pathological physiology of cardiac descriptions and tables of the murmurs.

s rather profusely illustrated. Many of these are l these are the best. On page 117 there is a very by Chase of an hemorrhagic infarct. This same pict- reproduced (p. 171) as an anæmic infarct. The object of this is obscure. The great dearth of histological illustrations, some 40 odd in the portion of the book devoted to Special Pathology, is striking and even these few do not compare with such illustrations as are found in Woodhead's Manual.

Briefly the arrangement of the book is original but unsatisfactory. The style is laborious and the excess of definitions in many places gives the book a dictionary-like aspect. In some instances the routine enumeration of causes, etc., may be of value. The attempt to cover the science of medicine in a text-book of Pathology has resulted in chapters on Parasitology, Clinical Microscopy, Bacteriology, Immunity and Clinical Diagnosis thus crowding the portions on pathological anatomy with the result that this portion of the book is inadequate. Important, even if unsettled, problems are not discussed, and the newer literature has been overlooked.

After a careful study of the work we feel that there are better pathologies for students, and that it needs careful revision to make it not only useful, but to correct its errors and bring it up to date.

A Text-Book of Pharmacology and Therapeutics or the Action of Drugs in Health and Disease. By ARTHUR R. CUSHNY, M. A., M. D., F. R. S., etc. Fifth Edition. Thoroughly Revised. Illustrated. Price $3.75. (*Philadelphia and New York: Lea & Febiger, 1910.*)

The fourth edition of this work was reviewed in the May, 1906, number of this journal, and its admirable qualities were pointed out. This present edition is an improvement on the last for it is brought thoroughly up-to-date, and therefore it may be endorsed with all the warmth it received before, and recommended to students and practitioners as the best work in English on this subject.

The Diseases of Women. A Hand-Book for Students and Practitioners. By J. BLAND-SUTTON, F. R. C. S. Eng., etc., and ARTHUR E. GILES, M. D., F. R. C. S. Edin., etc. Sixth Edition. Illustrated. Price $3.25. (*New York: Rebman Company, 1910.*)

The success of this manual is deserved; it was warmly reviewed in this journal (April, 1907), and this edition is an improvement on the last, as new and important chapters have been added in "Injuries to the Uterus," "Fibrosis Uteri," "Adenomatous Disease of the Uterus," "Vermiform Appendix," and "Injuries to the Ureters." It is an art to write a good manual, of which the number is limited, and this is one of the best in any specialty.

Clinical Commentaries. Deduced from the Morphology of the Human Body. By PROFESSOR ACHILLE DE-GIOVANNI, Director of the General Medical Clinic, University of Padua. Translated from the Second Italian Edition by JOHN JOSEPH EYRE, M. R. C. P., etc. Part—General. Price $4.50. (*New York: Rebman Company, 1910.*)

That the morphology of the human body should be studied as a help both in physiology and pathology will be denied by no wise physician, but that these "Commentaries" can be correctly drawn from such a study is very doubtful. The chapter on the "Morphological Examination of the Heart" is very typical of the author's point of view, and so it is fair to make certain extracts to indicate his methods. On pages 221-224 is described how to mark out the cardiac triangle on the surface of the body—the description is vague, which is explained in the following statement (p. 224): "I have already said more than once that I have no faith in averages, and I have given my reasons. Hence I have considered it useless to give the figures which concern the length of the sides of the cardiac triangle." Morphology, if it is to be studied like other exact sciences, must deal with figures and averages. Some of the difficulty met with in understanding the author may come from the very imperfect translation. On p. 225 occurs the following sentence: "The part which this contributes to forming the base and the apex naturally increases somewhat the proportion of the base and of the left ventricle; but at any rate in the maximal disproportion which refers to the right ventricle rests the criterion for concluding that the cause for the complexive enlargement of the heart is due both the right ventricle by reason of the entity of the disproportion of the side of the triangle which appertains to it." The author (p. 226), in italics, gives a method of measuring the fist and says if this is accurately taken "*one will have the measurement of the base of the heart.* This is a fact, not an opinion, ..." Throughout the work the author shows this unjustifiable (?) dogmatism. For instance, on page 96, we read "Following these conceptions, one comprehends that the external environment can modify the internal environment—that the diplococcus, for instance, of the saliva can become the penumococcus of pneumonia, and another the meningcoccus . . . ."

From the chapter on "*Fat and Panniculus Adiposus*" the following statements are taken: "and equally that the individuals in whom fat is produced beyond the ordinary amounts in some parts of their body demonstrate in these parts a morphological anomaly with a lymphatic character"; and further on "I have observed that in all ages the richness in fat coincides with a particular form of the body in which certain morphological relations that I shall indicate later on are always verified." One more quotation and we will close leaving it to those interested to decide as to whether the case is proven, as the author presents it, and whether so much can be deduced from morphology as he believes. "On the other hand, the growth of the trunk takes place less rapidly in the female sex than in the male, and this is in relationship with the great nervousness of females with scrofulous and rachitic constitutions. Without entering now into the discussion as to the importance of these ideas, it will be sufficient to state that we are dealing with the results of researches conducted without method [*sic*] with the sole object of finding averages [in which elsewhere the author has no faith], and not of forming series according to the requirements of the morphological method, and that, notwithstanding this, from the results we see arise the importance which a new study of the vertebral column must have for recognizing the variations of its development in relationship with the whole of the body, including the medulla spinalis" (p. 157).

Vaccine Therapy—Its Theory and Practice. By R. W. ALLEN, M. D., B. S. (Lond.), etc. Third Edition. Price $2. (*Philadelphia: P. Blakiston's Son & Co., 1910.*)

The author states in his preface to this edition that "it has been completely rewritten and brought up to date." It has filled a want and been successful, and will doubtless continue to do so. We refer our readers to the very favorable notice of it which appeared in this BULLETIN in March, 1909.

Practical Obstetrics. By E. HASTINGS TWEEDY, P. R. C. P. I., and G. T. WRENCH, M. D. Second Edition. Price $5.50. (*London. Henry Frowde and Hodder & Stoughton, 1910.*)

The first edition of this work appeared in 1908 under the title of "Rotunda Practical Midwifery" and was reviewed in this journal in December, 1909. What was said of it then applies today. It is a mistake to have changed the title. "The chapters on the toxæmia of pregnancy, uterine inertia, and contracted pelvis have been rewritten." Some other changes have been made in the book, and it is now a smaller volume, although the number of pages remains the same.

BOOKS RECEIVED.

Oxford Medical Publications. A System of Syphilis. In Six Volumes. Edited by D'Arcy Power, M. B. Oxon., F. R. C. S. and J. Keogh Murphy, M. C. Cantab., F. R. C. S. With an Introduction by Sir Jonathan Hutchinson, F. R. S. Vol. IV. Syphilis of the Nervous System. By F. W. Mott, M. D., F. R. S., F. R. C. P. 1910. 8vo. 502 pages. Henry Frowde, London; Hodder & Stoughton, London.

Diseases of the Colon and Their Surgical Treatment. (Founded on the Jacksonian Essay for 1909.) By P. Lockhart Mummery, F. R. C. S. Eng., B. A., M. B., B. C. Cantab. Illustrated by colored and other plates, and numerous figures in the text, many of which are reproduced from the author's sketches. 1910. 8vo. 322 pages. John Wright and Sons, Ltd., Bristol; Simpkin, Marshall, Hamilton, Kent and Co., Ltd., London.

Light Therapeutics. A Practical Manual of Phototherapy for the Student and the Practitioner. With Special Reference to the Incandescent Electric-Light Bath. By J. H. Kellogg, M. D. 1910. 8vo. 217 pages. The Good Health Publishing Company, Battle Creek, Michigan.

Education in Sexual Physiology and Hygiene. A Physician's Message. By Philip Zenner. 1910. 16mo. 126 pages. The Robert Clarke Company, Cincinnati.

Treatises on Fistula in Ano, Hæmorrhoids and Clysters. By John Arderne, from an Early Fifteenth-Century Manuscript Translation. Edited, with introduction, notes, etc., by D'Arcy Power, F. R. C. S. Eng. 1910. 8vo. 156 pages. Published for the Early English Text Society, Kegan Paul, Trench Trübner & Co., Ltd., London; Henry Frowde, London and New York.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by Hobart Amory Hare, M. D., assisted by Leighton F. Appleman, M. D. Volume II. June, 1910. 8vo. 363 pages. Lea & Febiger, Philadelphia and New York.

The Vegetable Proteins. By Thomas B. Osborne, Ph. D. 1909. 8vo. 125 pages. [Monographs on Biochemistry. Edited by R. H. Aders Plimmer, D. Sc., and F. G. Hopkins, M. A., M. B., D. Sc., F. R. S.] Longmans, Green and Co., London, New York, Bombay and Calcutta.

The Practice of Midwifery. Being the Seventh Edition of Dr. Galabin's Manual of Midwifery. Greatly Enlarged and Extended. By Alfred Lewis Galabin, M. A., M. D. Cantab.; F. R. C. P. Lond.; and George Blacker, M. D., B. S. Lond.; F. R. C. S. Eng.; F. R. C. P. Lond. Illustrated with 503 engravings. 1910. 8vo. 1123 pages. The Macmillan Company, New York.

Medical Education in the United States and Canada. A Report to the Carnegie Foundation for the Advancement of Teaching. By Abraham Flexner. With an Introduction by Henry S. Pritchett, President of the Foundation. Bulletin No. 4. 1910. 4to. 346 pages. D. B. Updick, The Merrymount Press, Boston.

American Practice of Surgery. A Complete System of the Science and Art of Surgery, by Representative Surgeons of the United States and Canada. Editors: Joseph D. Bryant, M. D., LL. D. Albert H. Buck, M. D. Complete in Eight Volumes. Profusely Illustrated. Volume Seven. 4to. 961 pages. William Wood and Company, New York.

~~inics.~~ ~~A Quarter~~ly of Illustrated Clinical Lect- ıd Especially Prepared Original Articles. Edited by W. Cattell, A. M., M. D. Volume II. Twentieth Series. vo. 304 pages. J. B. Lippincott Company, Philadel-

s of the Luzerne County Medical Society. For the ıding Dec. 31, 1909. Volume XVII. 8vo. 228 pages. Vilkes-Barre, Pa.

ı Asylums Board. Annual Report for the Year 1909. ear of issue) 1910. 8vo. 271 pages. Chas. Straker Limited, London.

ı the Rockefeller Institute for Medical Research. Re- Volume X. 1910. 8vo. 225 pages. New York.

the Warren Anatomical Museum. Harvard Medical No. 1. Pathological Anatomy. Bones. Joints. l Membranes. Tendons. 1910. 67 pages. Boston,

ught to Know About Your Baby. By Leonard Keene rg, B. A., M. D. A Text-Book for Mothers on the ıd Feeding of Babies, with Questions and Answers ly Prepared by the Editor. 1910. 8vo. 97 pages. terick Publishing Company, New York.

nd Motility of the Eye. With Chapters on Color Blind- l the Field of Vision. By Ellice M. Alger, M. D. With dred and twenty-two illustrations. 1910. 12mo. 380 F. A. Davis Company, Philadelphia.

of Electro-Therapeutics. By William James Dugan, With ninety-one illustrations. 1910. 8°. 242 pages. ıvis Company, Philadelphia.

f Laboratory Diagnosis. By Francis Ashley Faught, Second revised edition. Containing an indican scale s, eight full-page plates and numerous engravings in 1910. 8vo. 336 pages. F. A. Davis Company, phia.

f Physiology. With Practical Exercises. By G. N. M. A., D. Sc., M. D. Edin., D. P. H. Camb. With col- es and 450 other illustrations. Sixth edition. 1910. 4 pages. William Wood and Company, New York.

n Orthopedic Surgery. By Royal Whitman, M. D. dition, revised and enlarged. Illustrated with six and one engravings. 1910. 8vo. 908 pages. Lea r, Philadelphia and New York.

pératoire. Par Henri Hartmann. Avec 422 figures exte dont 80 en couleur. 1911. 4to. 498 pages. G. Paris.

ause and Treatment. By R. W. Murray, F. R. C. S. ition. With 62 illustrations. 1910. 8vo. 184 pages. hurchill, London.

Syndesmology. By Howard A. Sutton, A. B., M. D. K. Drinker, B. S. 1910. 8vo. 225 pages. P. s Son & Co., Philadelphia.

Measures Taken Against Malaria in the Lahore r.) Cantonment. By the Hon'ble Mr. R. Nathan, C. S., Lieutenant-Colonel H. B. Thornhill, C. I. E., Major L. Rogers, M. D., F. R. C. P., F. R. C. S., 09. 8vo. Fol. 55 pages. 1910. Superintendent t Printing, Calcutta, India.

the Sixteenth Annual Convention of the American Superintendents of Training Schools for Nurses. w York, May 16 and 17, 1910, and in conjunction ssociated Nurses' Alumnæ of the United States, torium in the Horace Mann School, May 18, 1910. ages. J. H. Furst Company, Baltimore.

Diseases of the Stomach and Upper Alimentary Tract. By Anthony Bassler, M. D. Copiously illustrated with numerous half-tone and line text-engravings and 56 full-page half-tone plates (with nearly 100 figures) plain and in colors, from original photographs and drawings. 1910. 8vo. 836 pages. F. A. Davis Company, Philadelphia.

Oxford Medical Publications. Publishers: Henry Frowde, London; Hodder & Stoughton, London. The following four volumes.

Fractures and Their Treatment. By J. Hogarth Pringle, M. B. (Ed.), F. R. C. S. (Eng.) Glasgow. 1910. 8vo. 384 pages.

A Handbook of the Surgery of Children. By E. Kirmisson. Translated by J. Keogh Murphy, M. C. (Cantab.), F. R. C. S. 1910. 8vo. 822 pages.

A System of Syphilis. In Six Volumes. Edited by D'Arcy Power, M. B. Oxon., F. R. C. S., and J. Keogh Murphy, M. C. Cantab., F. R. C. S. With an Introduction by Sir Jonathan Hutchinson, F. R. S. Vols. V and VI. 1910. 8vo.

Practical Physiological Chemistry. A Book Designed for Use in Courses in Practical Physiological Chemistry in Schools of Medicine and of Science. By Philip B. Hawk, M. S., Ph. D. Third edition, revised and enlarged. With two full-page plates of absorption spectra in colors, four additional full-page color plates and one hundred and twenty-seven figures of which twelve are in colors. 1910. 8vo. 440 pages. P. Blakiston's Son & Co., Philadelphia.

Rational Hydrotherapy. A Manual of the Physiological and Therapeutic Effects of Hydriatic Procedures, and the Technique of their Application in the Treatment of Disease. By J. H. Kellogg, M. D. With two hundred and ninety-three illustrations, nineteen in colors. Fourth revised edition. 1910. 8vo. 1247 pages. F. A. Davis Company, Philadelphia.

Die Faeces des Säuglings und des Kindes. Die Bedeutung und Technik ihrer Untersuchung. Von Dr. Adolf F. Hecht. Mit einen Vorwort von Hofrat Prof. Dr. Th. Escherich. 1910. 4to. 186 pages. Urban & Schwarzenberg, Berlin and Wien.

Andreas Vesalius, the Reformer of Anatomy. By James Moores Ball, M. D. 1910. Fol. XVII + 149 pages. Science Medical Press, Saint Louis.

Golden Rules of Refraction. By Ernest E. Maddox, M. D., F. R. C. S. Ed. "Golden Rules" Series. No. XII. Third edition, revised. 32mo. 96 pages. John Wright & Sons, Ltd., Bristol; Simpkin, Marshall, Hamilton, Kent & Co., Ltd., London.

Chronicles of Pharmacy. By A. C. Wootton. Two Volumes. 1910. 8vo. Macmillan and Company, Limited, London.

Applied Anatomy. The Construction of the Human Body Considered in Relation to its Functions, Diseases and Injuries. By Gwilym G. Davis. With six hundred and thirty illustrations, mostly from original dissections and many in color by Erwin F. Faber. [1910.] 4to. 630 pages. J. B. Lippincott Company, Philadelphia and London.

The Classification and Treatment of Diseases Commonly Known as Rheumatism. By Frank E. Peckham, M. D. Fiske Fund Prize Dissertation. No. LIII. 1910. 8vo. 76 pages. Snow & Farnham Company, Printers, Providence.

The Harvey Lectures. Delivered under the Auspices of The Harvey Society of New York, 1908-1909. By Prof. A. Calmette, Prof. W. G. MacCallum, Prof. Graham Lusk, Prof. W. Falta, Dr. John F. Anderson, Dr. M. J. Rosenau, Prof. A. B. Macallum, Prof. J. B. Leathes, Prof. Philip Hanson Hiss, Jr., Dr. C. B. Davenport. 1910. 8vo. 290 pages. J. B. Lippincott Company, Philadelphia and London.

Bier's Text-Book of Hyperæmia as Applied in Medicine and Surgery. By Professor Dr. August Bier. Only authorized translation from the sixth German revised edition by Dr. Gustavus M. Blech. With thirty-nine illustrations. [1909.] 8vo. 439 pages. Rebman Company, New York.

A Laboratory Text-Book of Embryology. By Charles Sedgwick Minot, LL. D. (Yale and Toronto), D. Sc. (Oxford). Second edition, revised with 262 illustrations, chiefly original. 1910. 4to. 402 pages. P. Blakiston's Son & Co., Philadelphia.

Vaccine Therapy. Its Theory and Practice. By R. W. Allen, M. D., B. S. (Lond.). Third edition. 1910. 8vo. 277 pages. P. Blakiston's Son & Co., Philadelphia.

The Diseases of Women. By J. Bland-Sutton, F. R. C. S. Eng., and Arthur E. Giles, M. D., B. Sc. Lond., F. R. C. S. Edin. Sixth edition, with 123 illustrations. [1909.] 12°. 554 pages. Rebman Company, New York.

Clinical Commentaries Deduced from the Morphology of the Human Body. By Professor Achille De-Giovanni. Translated from the second Italian edition by John Joseph Eyre, M. R. C. P., L. R. C. S. I., D. P. H. Cambridge. Part General. 8vo. 436 pages. Rebman Company, New York.

A Text-Book of Mental Diseases. By Eugenio Tanzi. Authorized translation from the Italian by W. Ford Robertson, M. D., C. M., and T. C. Mackenzie, M. D., F. R. C. P. Edin. [1909.] 8vo. 803 pages. Rebman Company, New York.

Oxford Medical Publications. Practical Nursing for Male Nurses in the R. A. M. C. and Other Forces. By Major E. M. Hassard, R. A. M. C., and A. R. Hassard. 1910. 12°. 339 pages. Henry Frowde, London; Hodder & Stoughton, London.

Oxford Medical Publications. Practical Obstetrics. By E. Hastings Tweedy, F. R. C. P. I., and G. T. Wrench, M. D. Second edition. 1910. 8vo. 491 pages. Henry Frowde, London; Hodder & Stoughton, London.

Oxford Medical Publications. History of Medicine. By Dr. Max Neuburger. Translated by Ernest Playfair, M. B., M. R. C. P. In Two Volumes. Vol. I. 1910. 8vo. 404 pages. Henry Frowde, London; Hodder & Stoughton, London.

The Lister Institute of Preventive Medicine. Collected Papers. No. 6. 1909-1910. 8vo. London.

Annual Report of the Sub-Department of Health Department of Public Safety. To the Mayor and City Council of Baltimore for the Fiscal Year ended December 31, 1909. 8vo. 243 pages. 1910. Meyer & Thalheimer, Baltimore.

A Manual of Human Embryology. Written by Charles R. Bardeen, Herbert M. Evans, Walter Felix [and others]. Edited by Franz Keibel and Franklin P. Mall. In Two Volumes. Volume I. With 423 illustrations. 1910. 4to. 548 pages. J. B. Lippincott Company, Philadelphia and London.

Normal Histology. With Special Reference to the Structure of the Human Body. By George A. Piersol, M. D., Sc. D. 438 illustrations, many of which are in colors. Eighth edition. (Re-written.) [1910.] 8vo. 418 pages. J. B. Lippincott Company, Philadelphia and London.

Lippincott's New Medical Dictionary. A Vocabulary of the Terms used in Medicine and the Allied Sciences, with their Pronunciation, Etymology and Signification. By Henry W. Cattell, A. M. (Laf.), M. D. (U. of P.) Freely illustrated with figures in the text. 1910. 8vo. 1108 pages. J. B. Lippincott Company, Philadelphia and London.

The Surgery of Childhood Including Orthopædic Surgery. By De Forest Willard, A. M., M. D. (Univ. of Pa.), Ph. D. With 712 illustrations, including 17 in colors. [1910.] 8vo. 5 pages. J. B. Lippincott Company, Philadelphia and London.

Scientific Memoirs. New Series, No. 37. By Officers of the Medical and Sanitary Departments of the Government of India. *Investigations on Bengal Jail Dietaries, with some Observations on the Influence of Dietary on the Physical Development and Well-being of the People of Bengal.* By Captain D. McCay, M. B., B. Ch., B. A. O., I. M. S. 1910. 4to. 226 pages. Superintendent Government Printing, Calcutta, India.

Cystoscopy as Adjuvant in Surgery. With an Atlas of Cystoscopic Views and Concomitant Text for Physicians and Students. By Staff-Surgeon Dr. O. Rumpel. Only authorized English translation by P. W. Shedd, M. D. With 85 illustrations in color on 36 plates and 22 texual figures. 1910. 4to. 131 pages. Rebman Company, New York.

The Priciples of Pathology. By J. George Adami, M. A., M. D., LL. D., F. R. S. Volume I. General Pathology. Second edition, revised and enlarged with 329 engravings and 15 plates. 1910. 8vo. 1027 pages. Lea & Febiger, Philadelphia and New York.

Symptomatic and Regional Therapeutics. By George Howard Hoxie, A. M., M. D. With fifty-eight illustrations in text. 1910. 8vo. 499 pages. D. Appleton and Company, New York and London.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by Hobart Amory Hare, M. D., assisted by Leighton F. Appleman, M. D. Volume III. September, 1910. 8vo. 338 pages. Lea & Febiger, Philadelphia and New York.

A Manual of Hygiene and Sanitation. By Seneca Egbert, A. M., M. D. Fifth edition, enlarged and thoroughly revised. Illustrated with 97 engravings. 1910. 12mo. 508 pages. Lea & Febiger, Philadelphia and New York.

A Treatise on Diseases of the Eye. By John Elmer Weeks, M. D. With 528 engravings and 25 full-page plates in colors. 1910. 8vo. 944 pages. Lea & Febiger, New York and Philadelphia.

The Practice of Medicine. A Guide to the Nature Discrimination and Management of Disease. By A. O. J. Kelly, A. M., M. D. Illustrated. 1910. 8vo. 945 pages. Lea & Febiger, Philadelphia and New York.

International Clinics. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles. Edited by Henry W. Cattell, A. M., M. D. Volume III. Twentieth Series. 1910. 8vo. 311 pages. J. B. Lippincott Company, Philadelphia and London.

Claims Arising from Results of Personal Injuries. The Relation Injury Bears to Disease and Disease to Injury. By W. Edward Magruder, M. D. 1910. 12mo. 266 pages. The Spectator Company, New York.

Pathogenic Micro-Organisms Including Bacteria and Protozoa. By William Hallock Park, M. D., and Anna W. Williams, M. D. Fourth edition, enlarged and thoroughly revised. With 196 engravings and 8 full-pages plates. 1910. 8vo. 670 pages. Lea & Febiger, New York and Philadelphia.

The Essentials of Histology. Descriptive and Practical. By E. A. Schäfer, M. D., Sc. D., LL. D., F. R. S. Eighth edition. 1910. 8vo. 571 pages. Lea & Febiger, Philadelphia and New York.

The Johns Hopkins Hospital Bulletins are issued monthly. They are printed by the LORD BALTIMORE PRESS, Baltimore. Subscriptions, $2.00 a year (foreign postage, 50 cents), may be addressed to the publishers, THE JOHNS HOPKINS PRESS, BALTIMORE; single copies will be sent by mail for twenty-five cents each. Single copies may also be procured from the BALTIMORE NEWS CO., Baltimore.

1911
RECEIVED

BULLETIN

OF

E JOHNS HOPKINS HOSPITAL

Entered as Second-Class Matter at the Baltimore, Maryland, Postoffice.

—No. 239.] BALTIMORE, FEBRUARY, 1911. [Price, 25 Cents

CONTENTS.

PAGE
e Herter Foundation. (Illustrated.)
FESSOR HANS CHIARI, M. D. 35
cidosis.
F. A. MAGNUS-LEVY 46
tions on the Bacteriology of the Baltimore City
LIAM W. FORD, M. D. 53
ngenital Deformities (Patent Ductus Botalli: Ab-
Left Kidney and Chronic Peripheral Œdema). (Illus-
RLES R. KINGSLEY, M. D. 56

PAGE
Transverse Fracture of the Body of the Ischium in 1893; Terminal Displacement in 1902; Diagnosticated in 1909. (Illustrated.)
By NORVELLE WALLACE SHARPE, M. D 57
Peri-Tonsillar Abscess
By MACTIER WARFIELD, M. D. 60
Summaries or Titles of Papers by Members of the Hospital or Medical School Staff Appearing Elsewhere than in the BULLETIN 61
Notes on New Books 64

LECTURES ON THE HERTER FOUNDATION.*

By PROFESSOR HANS CHIARI, M. D.,
Professor of Pathological Anatomy, University of Strassburg, Germany.

TION OF THE AMNION TO THE ORIGIN OF HUMAN MALFORMATIONS.

ologist would discuss the relation of the amnion of human malformations, he must base his views e gathered from pathological anatomy. He must ly the cases in point that he may recognize the luences which the amnion can exert. He must usly to ascertain causes for these pathological Finally, from his own experience and that of d in the literature, he must gain a correct view e frequency of deformities which depend upon nd must contrast them with deformities which rent way.

o one denies that human malformations may her ways and quite independently of the amnion. a child may inherit a deformity from either r its maternal ancestors: polydactylism illus- t. The cause for such malformations exists in —either ovum or spermatozoon. Again, some embryo may occasion malformation which is pathological collections of fluid within the body nhydrops). Occasionally, the umbilical cord or the second ovum where there is a double pregnancy, will exert a teratological influence. We also know that an injury directed against the abdomen of a pregnant woman may bring about fœtal malformation. To demonstrate the efficiency of this last influence I will relate the history of a case which I saw in the year 1881, while in Vienna, and which was published by Anton. The infant was a boy who died when fourteen days old. The autopsy revealed an imperfect corpus callosum; persistence of the embryonic median furrows of the cerebrum with microgyria; hair lip and cleft palate; and a fracture of the right femur which had healed in utero. The period at which the defect in the corpus callosum must have originated was the beginning of the fourth month of pregnancy. At this time, moreover, according to the mother's history, she had sustained an injury, falling on the ice in such a way as to receive the brunt of the blow upon her abdomen. This had caused the fracture of the femur, and favors Anton's view, that the same injury caused not only breaking of the bone, but also malformation of the brain. The pathologist who studies human malformations of amniotic origin, must do so in the light of both comparative pathology and experimental teratology. But he will be very careful in adopting their teaching, since the origin and significance of the amnion are not the same in man and in the lower animals.

---

the Medical Department of the Johns Hopkins ber 5, 6, 7, 1910.

I have had opportunity to study an unusually large number of human malformations. The cases, I shall bring to your attention are selected from this material, which was secured at the Universities of Prague and Strassburg.

By far the most common human deformities of amniotic origin are those caused by "Simonart's bands." These string-like portions of amnion usually pass from that membrane to the embryo. A great deal has been written about the malformations they cause. Such deformities represent widely different types, including hair lip, cleft palate, micrognathia; fissure of the face, of the brain, of the spinal cord; fissure of the thorax and of the abdomen; constriction of the penis, and malformation of the extremities.* These bands run not only from the amnion to the fœtus, but may pass from one part of the surface of the fœtus to another. It has been satisfactorily demonstrated that subsequent development of the embryo or fœtus may cause the amniotic bands to disappear after they have produced deformity; hence their previous existence may be attested at the time of birth only by the damage they have worked.

I am indebted to Professor Kretz for permission to use the following cases from the Pathological Museum at Prague:

Fig. 1 shows both hands of a nine-month fœtus with perodactylia caused by Simonart's bands; in other respects it was normal. On the left hand the fourth and fifth fingers, on the right hand the third, fourth and fifth fingers are imperfectly formed; the fingers mentioned on the right hand are not separated from one another. Remains of amniotic threads are seen on both hands, adherent to the affected fingers. We were unable to examine the placenta.

I have found the same kind of deformity in a woman seventy years old, and in her case the deformity was certainly caused by amniotic threads (Fig. 2). The right hand presents atrophy of the fourth and fifth fingers; the left hand, atrophy of the fourth and fifth fingers, together with a defective nail on the fifth finger, a deep dorsal furrow on the fourth finger, a rather deep furrow on the back of the first phalanx of the third finger, and a furrow on the back of the second phalanx of the index finger. These deformities were all present at birth.

In proof of the fact that amniotic bands may cause constriction about more proximal parts of the extremity, I offer, as an example, the case pictured in Fig. 3, which is that of an infant who died when three hours old. It presented fissures of the brain and of the face. The left hand showed indentations upon the third, fourth and fifth fingers; absence of the nail phalanx of the fifth finger, at the ulnar edge of which there still hung a remnant of an amniotic thread. On the right side, and about 1 cm. below the elbow, a deep circular fissure was found; the constriction reached the neighborhood of the bones of the forearm. At this point the skin was rent and the bones were broken as the result of injury at the time of birth. Distalwards from this circular fissure were found the remains of an extremity. It measured 5 by 3½ cm., had an oval shape, and was covered with skin. This structure corresponded to the upper arm and the hand. It was markedly œdematous, and at its peripheral end bore four digits; three of them, namely, the fourth and fifth fingers and the thumb, were well formed, except that the nail on the last was lacking. All were of normal size. The second finger was represented by a short, pyramidal projection of skin without any nail, and had been drawn upwards and outwards to the side of the thumb. Amniotic threads joined the above mentioned constriction in the forearm to the rudimentary finger, and held the latter as would a sling. The third finger was entirely lacking.

It would have been only a step from this deep circular fissure formation to complete intrauterine amputation of the right forearm. In this instance also, we had no opportunity to examine the placenta.

Much less frequently, amniotic bands are found attached to other parts of the body. Fig. 4 shows a shrivelled, sixth-month fœtus papyraceous, which had died sometime before birth. Amniotic adhesions appear on the head. A band 4 cm. long and 2 mm. thick extended from the skull of the fœtus to a point on the placenta near the insertion of the umbilical cord, and was twisted in a spiral about the latter structure. A club-shaped appendage was found in the region of the large fontanelle, immediately in front of the amniotic band with which it was connected. The appendage was 1 cm. long, and 5 mm. thick at its free end. It was covered with skin, contained a cavity which could be traced through its pedicle into the cavum cerebri, and clearly represented an encephalocele. The periphery of the placenta had involuted and completely atrophied; but for that, the amnion presented its normal characteristics.

In this case, then, we have seen an amniotic band attached to the head of an embryo and an encephalocele produced through the traction thus occasioned. Moreover, fœtal death was very likely the result of its action, since constriction of the umbilical cord by the band would seem to account for that event.

Figure 5 represents a case of schizosoma caused by amniotic bands. The fœtus was about 38 cm. long. A short, ribbon-like band of amnion passed from the region of the navel to the back of the fœtus and had drawn along a tongue-shaped projection of skin with a small, round cutaneous appendage upon it. In consequence of this band, several deformities had arisen, namely, a deep transverse furrow across the back; imperfect closure of the pleuro-peritoneal cavity on the right side; protrusion of the viscera; and defective formation of the right upper extremity. There was no umbilical cord. The umbilical arteries and the umbilical vein issued from the lower edge of the abdominal fissure. These vessels were closely approximated, and ran to the placenta surrounded by a very small quantity of Whartonian jelly, which in turn was encased in amnion. The other malformations noted in this specimen were a median fissure of the thumb; talipes varus with heptadactylia on the left side and talipes valgus with hexadactylia on the right. A few amniotic threads hung upon the right amnion which covered the placenta exhibited a few ads, scattered here and there over its inner surface.

---

* See Von Winckel.

illustrates the group of cases in which amniotic from one part of the fœtal body to another. This 0 cm. long and of the male sex. An encephalocele, zontal circumference of 22 cm. appeared upon the skin covering it was very thin; the hernial opening wide; the cavity within the skull was quite small. tho-palatoschisis appeared upon the right side of rom the chiloschisis a fissure ran upwards through alf of the nose to the anterior edge of the hernial thread-like cord 10 cm. in length was attached at point, and ran toward the right axilla, where it o three parts, one of which was attached to the d one to the posterior axillary fold; the third was the back near the lower angle of the right scapula. e, the right hand was deformed; the fingers from to the fifth were small, malformed, without nails cted by manifold, delicate amniotic threads. The f the fourth finger on this hand had turned black. oot showed a valgus, and the left a varus position. a was not obtained.

ical anatomy also teaches that the mediation of bands is not the only way in which the amnion sally related to fœtal malformations; abnormality of the amniotic cavity, and particularly a diminu- f reacts harmfully upon the development of the ses of this sort have been recorded by Marchand and e. In the case reported by Marchand, the embryo l six to seven weeks' development. Adhesions were t there was also a particularly defective amnion. ugh the latter anomaly that the embryo had suf- ive deformation. A continuous layer of amniotic was seen upon the inner surface of the chorion. ttributed this either to a late proliferation of m from the point where the amnion had rup- cleavage between the amnion and the chorion. se pertained to a seven-month fœtus, in which ab- acture of the amnion had caused unusual bending extensive adhesions of different parts of the body, f malformations.

nection, I am able to add another case, illustrated d 7b. This specimen consisted of a 34 cm. long, , which presented fissure of the face, a scar to- two cylindrical cutaneous appendages upon the skull and perodactylia of both hands as well as oot; from the digits of the last remains of am- ns hung. Moreover, in this specimen we found lving the abdomen and the lower part of the of the abdominal organs and the left lung ugh the opening. The trunk of the fœtus was narrow, and gave the impression of having been corset. A thick, net-like covering of amnion, ny apertures, was fitted closely about the body, herent save at the edges of the fissure. The entered at the right edge of the abdominal fissure. This structure was 13 cm. long, and was inserted upon the margin of the placenta, which had a diameter of 17 cm. The amniotic covering of the placenta, and indeed of the entire inner surface of the chorion was lacking. Microscopical study verified that fact, showing only a few delicate thread-like remnants of the membrane. The short umbilical cord was entirely covered by amnion.

From the findings in this specimen, the conclusion is unavoidable that the schizosoma had been produced by diminution in the size of the amnion. The body of the embryo had been surrounded by a closely applied corset which interfered with the closure of the pleuro-peritoneal cavity. The membrane had become detached in the neighborhood of the head and the extremities; these regions were separated from the rest of the amnion. Malformation of the head and extremities had been caused by Simonart's bands, remnants of which were attached to the inner surface of the chorion.

I found a specimen in the Prague Museum which probably belongs to this group of cases. The fœtus was a male, and had reached the fourth month of development. One could not actually demonstrate that the amniotic cavity had been contracted, but could prove that the cause of the deformity was abnormal pressure against the amnion in the locality of the affected parts (Fig. 8). The left upper extremity of the fœtus was rudimentarily developed, and supplied with only one digit. The limb was attached in a deep fossa upon the left wall of the thorax where the cartilages of the third, fourth and fifth ribs were absent, and the pectoralis major muscle, as well as the neighboring intercostal muscles, were very thin. In this instance, it seems fair to suppose that the amnion which enclosed the left upper extremity had been too small, and that perobrachia was produced in that way. Ritter, Ganghofner and Eppinger have described cases of the same character.

Viewed from the standpoint of pathological anatomy, it is not impossible that malformations and even death of the embryo may result from an abnormally spacious amnion, or to a premature collection of amniotic fluid. Yet, actual observations, so far as I know, have not been made to substantiate this opinion; nor have I observed cases which would seem to belong in that category.

What do we know concerning the cause and mode of formation of either Simonart's bands or of an abnormally small amniotic cavity?

Originally, Simonart's bands were thought due to an organization of lymph (Montgomery), which was referred to some inflammatory process (Simpson, Gratzer, Simonart). Many authors, including Virchow, accepted the inflammatory hypothesis. In 1854, G. Braun expressed the view for the first time that Simonart's bands were in reality abnormally disposed portions of the amnion itself. He inferred that they originated in consequence of pathological folding of the amnion, and that this phenomenon, in turn, depended upon a scant quantity of amniotic fluid.

C. Braun explained the presence of these bands through the formation of plastic adhesions. Kustner elaborated the theory, and suggested that intimate contact was established between the amnion and the embryo during the early days of development. He considered that narrowing of the amnion, a deficiency of amniotic fluid and the formation of folds in the membrane might bring about adhesions between it and the young embryo. These adhesions gradually became firmer and occasioned the malformation. Possibly, other outgrowths might later develop from the amnion, but in that event the epithelium covering the surface of the fœtus would have to die before adhesions could occur. Finally, Kustner believed that a deficiency of amniotic fluid made it possible to have secondary adhesions arise in connection with fissure formation when the epithelium of the medullary folds or of the intestinal wall was elevated. Later Kustner described a case of congenital amputation of hands and feet by amniotic threads, which resulted from a rent in the amnion due to the mother lifting a heavy load during the second month of pregnancy. The amnion had entwined itself about the umbilical cord, and entangled the extremities of the embryo, thereby affecting their amputation. Olshausen discussed tearing of the amnion as a source of amniotic threads, and concluded that the amnion may rupture spontaneously if its cavity be too small. Stoeckel has quite recently collected a series of these cases in which extra-amniotic pregnancy was associated with amniotic bands.

My own view is that adhesions between the epithelium of the amnion and the ectoderm of the fœtus are of primary importance in the formation of Simonart's bands. Although we are not as yet sufficiently familiar with the development of the amnion (Graf v. Spee holds the interesting view that the amniotic cavity in the human arises as a closed cavity within the blastodermic vesicle and develops from the ectoblast) still we know that it is formed very rapidly, since the youngest human ova which have been described already possess a closed amnion. Embryos of 10 mm. are closely surrounded by amnion. Embryos of 11-15 mm. are separated from the amnion by a distance of only 1-3 mm., and it is only when a length of more than 20 mm. has been attained that the quantity of amniotic fluid becomes commensurate with the size of the embryo, thus insuring an appropriate separation between it and the amnion (Marchand, Kollman).

With these facts in mind, it is not difficult to understand how the human embryo may become adherent to the amnion during the early weeks of pregnancy. The ectodermal cells on the inner surface of the amnion, as well as those covering the surface of the embryo, are young and active, and can fuse together easily if they are not sufficiently separated from one another. The union will gradually grow firmer. Later, when the amniotic fluid begins to develop, the adhesions are drawn out and become Simonart's bands, stretching from amnion to fœtus, or from one part of the fœtus to another. Inasmuch as these adhesions occur during the earliest stages of development they cause the most extreme types of deformity, one can imagine. This conception, which includes a primary adhesion and a later fusion of the two epithelial surfaces belonging respectively to the amnion and to the embryo, agrees perfectly with the histological findings in Simonart's bands. Microscopically, these bands consist of a wavy mass of amniotic connective tissue, exhibiting very few nuclei and no blood vessels. They are covered by amniotic epithelium which shades into the fœtal epidermis. As they approach the embryo, the covering of these bands often presents the typical structure of skin, from which we may infer that they ultimately draw out the skin, making it a part of the band.

In addition to the mode of formation just described, others occur, though much less frequently: thus, Simonart's bands may arise in consequence of rents in the amnion. This appears to me to support the interpretation of the previously mentioned case with corset-formation, which was attributed to contracture of the amnion combined with laceration of the membrane and the production of Simonart's bands.

Valuable contributions from the field of experimental teratology shed light upon the causation of narrowing of the amnion, and the mechanism by which it is produced. In this connection, reference should be made to the unusually interesting experiments of Dareste. By raising and lowering the temperature of an incubator, and by warming different parts of a hen's egg unequally, this investigator frequently succeeded in producing disturbances in the development of the amnion. Moreover, embryonic malformations, apparently of amniotic origin, were noted: cyclopia was occasioned by narrowing of the head-fold, and symelia by narrowing of the tail-fold. These experimental observations support the conception that narrowing of the amnion has a very direct bearing upon the origin of certain human malformations. To be sure, these results are not strictly analogous with similar human deformities, since the formation of the amnion in the chick and in man are essentially different. In the former, the amnion is formed by the union of the folds which arise at the anterior and posterior ends of the body as well as at either side. These folds meet and fuse over the back of the embryo. With this mechanism, it becomes very easy to have serious interference with development of the embryo, since either the head, the tail, or one of the side folds may not rise sufficiently, and thus fail to reach its proper destination. As a result of such aminotic defects, malformation of the embryo occurs.

In the development of the human ovum, according to His, the amnion is formed exclusively by the head-fold; this extends over the embryo toward the tail, and ultimately shuts in the amniotic cavity. None the less, here again it becomes entirely possible for the amnion to attain incomplete development through one harmful influence or another, and a pathological narrowing of the cavity may result. We can also imagine the amnion becoming abnormally firm and rigid in consequence of some disease; so that it is incapable of the distension requisite for the subsequent growth of the embryo. Of course that is only an hypothesis at present. We meet occasionally with cases which demonstrate that the amnion may undergo pathological thickening, and attribute it to an inflammatory change. In this connection, the interesting case of v. Franqué should be cited. There a number of wart-like nodules were noted on the fœtal side of the amnion, and near them superficial plaques were found. These had arisen through the proliferation of amniotic stroma about certain the fœtal skin (vernix caseosa, desquamated epi-ll clumps of lanugo hair), which had been de- the amnion. Further, the fact should be men-so-called "wind eggs"—a name given cases in nbryo has perished—often present circumscribed ckening of the amnion. Microscopically, the con-s to be a proliferation of amniotic stroma and

portion of human malformations can be fairly n amniotic origin may be difficult to decide, but n exist that the number is large. Among 178 formation studied by v. Winckel, 29 cases (16.3 ere referable to Simonart's bands. My own ex-s me to a similar conclusion. Beside this group, other in which deformity is due to narrowing of cavity; and the latter, according to my view, is rge as the former. Combining the two, I would -third of all human malformations to some in-ed by the amnion. Such an estimate, moreover, e into account the deformities met with in cases os.

, it becomes impossible to demonstrate the am-of malformations. On the one hand, it fre-pens that the membranes are studied too super-on the other, Simonart's bands, as well as evidence ving of the amniotic cavity, may disappear in the of pregnancy. For these reasons, it is desirable larger amount of material and study it more an has been done.

ion, I should like to speak of congenital defects, in the skin, especially about the head, and have to the traction of amniotic bands. Keller has wed cases of this sort and included a new ex-was observed in the Pathological Institute at The defect was located upon the skull, and dif-respect, from similar cases thus far reported. examination in this instance showed that hair present at the site of the defect. That finding with the hypothesis that very early amniotic ted. Therefore, Keller, concluded, if the tear-mniotic adhesions was to account for the de-case, the adhesions must have developed after ith and not during the early days of embryonic Moreover, he held that some inflammatory ndamentally responsible and his opinion had t the mother had suffered from endometritis. as firmly attached to the uterus and its separa-plished with difficulty. Such a case certainly nflammatory changes in the amnion be given ation in future study of the development of

REFERENCES.

itnis der Störungen im Oberflächenwachstum des Gehirns. Ztschr. f. Heilk., 1886.
Beitrag zur Lehre von den amniotischen Bänd-h Einfluss auf die foetale Entwicklung. Ztschr. d. Aerzte in Wien, 1862.
G. Braun: Ueber spontane Amputationen des Foetus und ihre Beziehungen zu den amniotischen Bändern. Ibid., 1854.
Dareste: Recherches sur la production artificielle des monstruosités ou essais de tératogénie experimentale. Paris, 1877.
v. Franqué: Zur Kenntnis des Amnionanomalien. Monatschr. f. Geburtsh. u. Gynäk., 1897.
Grätzer: Die Krankheiten des Foetus. Breslau, 1837.
Keller: Zur Kenntnis der congenitalen Hautdefecte am Kopfe des Neugeborenen. Diss. inaug., Strassburg, 1908.
Kustner: Amniotische Bander und Strange. Muller's Handbuch d. Geburtsh., 1889.
Kustner: Ueber eine noch nicht bekannte Entstehungsursache amputirender amniotischer Fäden und Stränge. Ztschr. f. Geburtsh. u. Gynäk., 1890.
Montgomery: Dublin J. for M. & S., 1830.
Olshausen: Spontanamputation durch amniotische Bänder, Verh. d. Gesellsch. f. Geburtsh. u. Gynäk. in Berlin, 1896.
v. Ritter, Ganghofner und Eppingtr: Ein Fall von angeborener Lücke des Brustkorbes, Oest. Jahrb. f. Paed., 1876.
Simonart: Amputations spontanées. J. d. conn. méd. prat. Bruxelles, 1846.
Simpson: Edinb. M. & S. J., 1836.
v. Spee: Neue Beobachtungen über sehr frühe Entwicklungsstufen des menschlichen Eies. Arch. f. Anat. u. Phys., 1896.
Stoeckel: Anomalien der Eihäute. v. Winckel's Handb. d. Geburtsh., 1905.
Virchow: Die siamesischen Zwillinge. Berl. klin. Wchnschr., 1870.
v. Winckel: Ueber menschliche Missbildungen. Volkmann's Saml. Vort., 1904.

II. Necrosis of the Pancreas.

Necrosis of the pancreas may arise from many different causes. It may be due to a severe trauma, directly affecting the organ, as for example in gunshot wounds; or it may be caused by corrosive poisons, such as sulphuric acid, acting through the stomach wall. Again it may develop from the perforation of a petic ulcer of the stomach, or result from an inflammation of the pancreas, in so far as extensive necrosis and putrefaction may follow suppuration of the organ. It is my belief, however, that much the most common cause of necrosis of the pancreas is autodigestion due to the tryptic ferment of the pancreas.

The corrosive action of the pancreatic secretion has been known for a long time, and the tryptic autodigestion of the pancreas has been pointed out likewise. In 1879, Klebs attributed pancreatic hemorrhages to the corrosive action of pancreatic juice. Gussenbauer in 1883 described a cyst of the pancreas which had been formed by the destruction of a melanosarcoma by the pancreatic secretion. Arnozan and Vaillard referred in 1884 to the post mortem autodigestion of the pancreas in animals. Selzer (1886) and Wölfler (1888) thought that the erosion of the walls of pancreatic cysts by the pancreatic secretion might lead to hemorrhages. Pelliet (1889) and von Hansemann (1894) noted the frequency of post mortem autodigestion of the pancreas. Tilger (1894) attributed the origin of pancreatic cysts to autodigestion in pancreatitis. Nimier (1894) emphasized the importance of the pancreatic secretion as a source of pancreatic cysts, following injury to the duct of Wirsung. In 1895 I described the occurrence of intra-vitam, intra-agonal and post mortem autodigestion of the pancreas, and drew a comparison between this and peptic autodigestion of the stomach wall. Blume (1897) and Pförringer (1899) supported my views, and Blume, as well as Beneke, sought the cause for intra-vitam autodigestion in temporary ischæmia, and Pförringer in fat necrosis. I described in 1900 a case of focal intra-vitam autodigestion in all probability caused by arteritis obliterans. Gaylord (1901) reported autodigestion of the pancreas following gunshot wounds. In 1901 and 1902 Lazarus attributed anew the origin of pancreas cysts to autodigestion.

Numerous cases of intra-vitam tryptic autodigestion of the pancreas were, in my opinion, incorrectly interpreted, being described as hemorrhage of the pancreas, as pancreatitis hemorrhagica and gangrenosa (Fitz) and as necrosis of the pancreas from other causes. Here are to be found many pertinent observations, which resulted from investigation of cases of fat tissue necrosis by Balser (1882) which have since been proved to be due to a lipolytic ferment of the pancreas. The necrosis of the pancreatic tissue so frequently found has been considered, by most of the writers, as secondary in relation to the necrosis of the fat tissue, and even those authors who regarded the pancreas necrosis as primary, and the fat tissue necrosis as secondary, did not ordinarily think of a tryptic autodigestion as the cause of the pancreas necrosis, but rather assumed a primary pancreatitis. Only a few writers (Dettner, 1895; Hildebrand, 1898; Konheimer, 1898; Kaufmann, 1891) took the position that the spontaneous fat tissue necrosis was due to an intravital tryptic autodigestion, rather than to a traumatic rupture of the ducts of the pancreas. In 1902, I expressed myself firmly of the belief that both these conditions regularly belonged together, in the sense that the primary factor was the tryptic autodigestion of the pancreatic tissue, which was followed by the necrosis of the fat tissue, due to a pouring out of the fat ferment and its diffusion. I was also able to show that in post mortem and especially in intra-agonal autodigestion of the pancreas, it was not seldom the case that the fat tissue in the pancreas showed the beginning of the changes as they occur in necrosis of the fat tissue, and I explained further that the pancreas hemorrhages and pancreatitis acuta hemorrhagica and gangrenosa were nothing more than changes in the pancreas due to autodigestion. Necrosis is primary and possible inflammation is secondary. Then Weil (1904), Reitter (1905) and Truhart (1906) expressed similar opinions. In 1906 I maintained the view that the intra-vitam tryptic autodigestion of the pancreas might, *on the one hand,* be a most important process, leading to extensive hemorrhages in the pancreas and its neighborhood, to hemorrhagic cyst formation of the pancreas, to focal or diffuse necrosis of the pancreas and to suppurative pancreatitis and sequestration of the pancreas if pathogenic bacteria invaded it; but that *on the other hand* from circumscribed slight tryptic autodigestion of the pancreatic tissue, harmless, small areas of pancreas necrosis and fat tissue necrosis (secondary autopsy findings) might develop, which areas of pancreas necrosis might disappear entirely by absorption. But in view of this, tryptic autodigestion of the pancreas deserved the title of a *morbus sui generis.* Williams and Busch (1907), Truhart (1908) and most recently, Opie and Meakins (1910), have expressed similar views, so that the doctrine of the tryptic autodigestive necrosis of the pancreas seems to be well founded.

There is not the least doubt that the *causes for the occurrence of a "spontaneous" intra-vitam tryptic autodigestion* of the pancreas may be manifold. Anything which may lead to injury of the tissues of the pancreas or to activation of the tryptic zymogen, may induce tryptic autodigestion of the pancreas. I would call especial attention to the following important etiological factors: slight trauma of the pancreas, not causing rupture of a duct; disturbances of the pancreatic circulation, which may be looked upon (Benecke and Blume) as spastic anæmias, which may be caused by the frequently noted arteritis obliterans; stagnation of the pancreatic secretion; entrance of bile into the duct of Wirsung in cases of cholelithiasis, as was first shown by Halsted and Opie in 1901; and finally entrance of the secretions of the stomach, or the contents of the duodenum into the duct of Wirsung (Hess, 19[illegible] and 1905; Beitzke, 1905). In individual cases one must always recall, and consider, as Eppinger showed in 1905, that the kinases which are able to activate the pancreatic secretion may be of many different kinds. I will not deny that tryptic autodigestion of the pancreas may arise from a primary inflammation of the organ, but I think it happens rarely.

The consequences of tryptic autodigestion of the pancreas may vary widely. As I have mentioned, a grave disease may result. Death may result from severe hemorrhage—the so-called apoplexy of the pancreas. Within a few days death may follow after symptoms of ileus and peritonitis, when one usually finds extensive necrosis of the fat tissue in association with the reactive inflammatory necrosis of the pancreas. The cause of death in such cases is to be attributed either to the resorption of a pancreas toxin (Dobenauer, 1906) a product of necrosis, or to poisoning by trypsin (Guleke, 1906). Starting from the pancreas a diffuse abdominal tryptic destruction of the cellular tissue may arise, as I, myself, had opportunity to report in a case (1909). Suppuration and gangrene of the pancreas, with eventual sequestration of the organ, may develop. Cysts of the pancreas may form in consequence of the tryptic autodigestion. On the other hand, however, the tryptic autodigestion of the pancreas may be an insignificant process which induces small circumscribed necrosis of the tissue of the pancreas, and small circumscribed areas of fat tissue necrosis. In the course of time all these foci may disappear, through absorption of the necrotic tissue, or at least of the foci of (necrotic) pancreatic tissue in which case we may conclude from the presence of old fat necrosis in the pancreas and its neighborhood that there has been an earlier autodigestion of the gland.

From all this it is easily seen what an important rôle the tryptic autodigestion of the pancreas plays. It is surely one of the most important factors in the pathology of this organ. The practicing physician must be cognizant of this autodigestion, since experience has shown that in the severe cases life oftentimes may be saved by surgical measures.

III. SPONDYLOLISTHESIS.

Following the enunciation by Kilian in 1853 that spondy- olisthesis is a pelvic deformity resulting from a gradual glid- ng forward, or an olisthesis, of the inferior surface of the last mbar vertebra over the anterior border of the first sacral ertebra, a large special literature has developed upon the bject.

The spondylolisthetic pelvis is of the greatest practical in- rest to the obstetrician on account of the part which it may ay in the production of dystocia. On the other hand, the isthesis demands attention from the pathological anatomist an example of a peculiar acquired displacement of the rtebræ, whose mode of origin is not easy to understand.

Practically every case coming within this category has been scribed and published, so that Neugebauer, who devoted rticular attention to its study was able to collect

11 clinical and 12 anatomical cases in 1882
37 " " 24 " " " 1885
47 " " 53 " " " 1892
and 55 " " 60 " " " 1893,

ing a total of 115 cases. This, however, included 10 cases listhesis of the fourth lumbar vertebra, and one instance lving the first sacral vertebra. Furthermore, in 1899, liams described a new specimen, and collected 123 cases the literature, 62 of which were clinical and 61 ana- ical. He also stated that Dr. Authur Dean Bevan had rmed him that he had observed several cases in the dissect- room in Chicago.

cording to Olshausen and Veit about 130 cases had been rted up to 1902, 70 of which were described anatomically the remainder reported clinically.

llowing the publication of Williams, and including his nen, I have been able to collect 10 clinical and 7 anatomical so that the entire number thus far recorded amounts to

At the same time, it must be admitted, particularly g the cases which were described clinically, that in not a he diagnosis was at least doubtful. Moreover, in several nens, which were described anatomically, only the pelvic n of the vertebral column or even isolated vertebræ were ble for study, so that Breus and Kolisko in 1900, in their nental work on Pathological Forms of the Pelvis, after ing the imperfect preparations, as well as those in which sthesis was only beginning, stated that only 18 examples ll-developed spondylolisthesis were on record, accom- by a satisfactory anatomical description of the pelvis, these they added two additional specimens which they scovered in Vienna.

cially from a clinical point of view, the means of diag- ting spondylolisthesis have been fully developed; and s of characteristic symptoms described, such as the rse furrow in the back above the lumbo-sacral juncture, nbar lordosis, the diminished pelvic inclination, and uliar "rope dancer gait" of the individuals affected At the same time, the importance of lumbo-sacral olisthesis has been accentuated on account of the important part it may play in reducing the size of the pelvis and thus interferring with the act of labor.

Anatomically the various changes in the shape of the bones and ligamentous structures have been described, and the effect of the olisthesis upon the form of the pelvis has been studied, more particularly by Breus and Kolisko. According to these authors, a fully developed spondylolisthetic pelvis is a "pelvis obtecta," which is composed of plump, massive bones. With the exception of the conjugata vera, the pelvic measurements are usually large. The former, however, as a result of the olisthesis, is markedly shortened, in that the antero-posterior diameter of the pelvic inlet, which takes the place of the vera, will impinge posteriorly upon the ventral surface of one of the prolapsed lumbar vertebræ, instead of upon the promontory of the sacrum. The pelvic inclination is also diminished, the upper end of the sacrum appears to be inclined posteriorly, and the region of the symphysis pubis elevated. Frequently, the vertical concavity of the sacrum is markedly increased and the entire bone is retroposed, and the articulation between the first and second sacral vertebræ gapes toward the sacral canal. The ilio-sacral joints are markedly developed, their ligaments strong and the acetabula deep. All of these changes are to be attributed to the forward displacement of the center of gravity of the body, and to the change in the manner in which the body weight is transmitted to the sacrum, and tend to become more and more pronounced until the olisthesis is checked by synostotic processes.

The most interesting question in connection with this subject is the mode of production of the olisthesis, and numerous theories have been advanced in the attempt to solve it. Kilian in his original communication considered that the most important etiological factor consisted in an inflammatory softening of the last intervertebral cartilage, as well as of the neighboring ligaments and vertebræ. At the same time, he admitted the possibility of spondylolisthesis developing as a result of retrogressive changes in the first sacral vertebra. Ritgen in 1854 expressed the belief that the anomaly might result from an œdematous condition of the spinal membranes, which had not led to the production of spina bifida (hydrorrhachis incolumnis).

Robert in 1855 was the first to resort to experiment in the hope of elucidating the etiology of lumbo-sacral spondylolisthesis, and showed that it never followed mere section of all the ligamentous structures about the lumbo-sacral juncture, but readily occurred after the interarticular portions of the arch of the last lumbar vertebra had been sawed through, and the last intervertebral cartilage severed. From these observations, he concluded that the development of lumbo-sacral spondylolisthesis is usually prevented by the articular processes, and can only occur after their destruction. Or, it might follow luxation of the inferior articular processes of the last lumbar vertebra, or finally be due to a general softening of the ring of the last lumbar vertebra which permitted its articular processes to become so far removed from its body that the latter could glide forward and downward, while its inferior articular processes still remained in contact with the superior articular processes of the first sacral vertebra.

The hydrorrhachis theory was generalized by Lambl in 1856 and in 1858. He held that such a condition could give rise to a pseudoarthrosis of the interarticular portion of the last lumbar vertebra, which would lead to the formation of a spondylolysis interarticularis. At the same time, he admitted the possibility of spondylolisthesis lumbo-sacralis developing as the result of luxation of the lumbo-sacral articular processes, or from a fracture of the arch of the last lumbar vertebra, as well as from the presence of a rudimentary accessory vertebra (Schaltwirbel).

Breslau, in 1861, in describing a new case, designated as caries sicca an inflammatory softening of the bony tissue of the last lumbar and first sacral vertebræ, as well as of the last intervertebral cartilage; and stated that the lengthening of the vertebral arch in spondylolisthetic processes could therefore be secondary in nature. In 1863 Hugenberger attributed a case of traumatic lumbo-sacral spondylolisthesis to forcible luxation or fracture of the articular processes; while Blake in 1867 considered that the development of the olisthesis might be due to excessive stretching of the ligaments at the lumbo-sacral juncture resulting from lipomatosis universalis. Blasius and Ender in 1868 and 1869, respectively, contended that their cases should be attributed to lumbar caries.

The idea that spondylolisthesis lumbo-sacralis might be the result of abnormal stretching of the interarticular portions of the last lumbar vertebra, dependent upon imperfect ossification, originated with Königstein in 1871, and was based upon experiments similar to those of Robert, to which reference had already been made. At the same time, he admitted the possibility of Lambl's theory, and of the part played by an accessory vertebra. Von Weber-Ebenhof in 1874 described two cases, which he considered followed luxation of the lumbo-sacral articular processes, and contended that this was the general rule. Caries of the lumbo-sacral articular processes was considered by Didier in 1874, and by Herrgott in 1877, as a satisfactory explanation for the development of spondylolisthesis, and Van der Bosch expressed similar views in 1879.

In 1878 I contended that the cause of the olisthesis in the "kleines Wiener Becken" was to be found in a congenital anomaly of the sacrum, while in the "grosses Wiener Becken" the lesion in continuity in the interarticular portions of the last lumbar vertebra was due to fracture.

In 1882 Strasser believed that his case of lumbo-sacral olisthesis was the result of arthritis deformans of the lumbo-sacral joints, with the consecutive elongation of the arch of the last lumbar vertebra.

In the same year, appeared the highly important monograph of Neugebauer, in which he demonstrated that in lumbo-sacral spondylolisthesis only the anterior half of the last lumbar vertebra showed signs of displacement, and that the "dolicho-platy-kyrto-spondylus" which characterized it was the result of imperfect ossification of the interarticular portions of the last lumbar vertebra, or was due to their fracture. He accordingly defined spondylolisthesis as a mechanical deformity (Belastungs-difformität) of the last lumbar vertebra developing gradually in extra-uterine life in the presence of certain predisposing conditions, as the result of the action of the body weight. Moreover, in 1852, Neugebauer stated on the basis of Strasser's case that an originally normal last lumbar vertebra might develop this deformity secondarily, as the result of an olisthesis due to fracture of the superior articular processes of the first sacral vertebra, should the former be arrested by the posterior margin of the first sacral vertebra and acquire an abnormal chronic inflammatory plasticity. Under such circumstances, a further olisthesis could develop only from the anterior half of the last lumbar vertebra.

Neugebauer reiterated similar views in 1883, 1884 and 1885, and laid particular stress upon the frequency of interarticular spondylolysis, which he gradually came to attribute more and more to a primary defect in development. In 1884 and 1885 Arbuthnot Lane dissented from Neugebauer's teaching concerning the great importance of congenital spondylolysis interarticularis, and contended that spondylolisthesis was merely a manifestation of a deformity of the last lumbar vertebra, due to excessive pressure resulting from the continued carrying of heavy burdens by the individual. This he held not only gave rise to the change in form of the vertebra, but also to the lesions in continuity in the interarticular portions.

Kruckenberg in 1885 pointed out that fracture of the lumbo-sacral articular processes might also occur secondarily in the course of an olisthesis; and H. von Meyer in 1877, after studying a case of spondylolisthesis of the first sacral vertebra, stated that the condition might occur as the result of imperfect development of the superior articular processes of the first sacral vertebra, even without the presence of spondylolysis interarticularis.

Neugebauer described a new spondylolisthetic pelvis in 1884 and demonstrated that it was certainly not attributable to hydrorrhachis, and clearly refuted the attacks of Lambl in that connection. In the following year he also adduced conclusive evidence of the possibility of a separation in continuity in the interarticular portion of the last lumbar vertebra occurring as the result of trauma, and gave a very accurate anatomical description of such a case.

In 1892 I attempted to bring together the various possible etiological factors concerned in the production of spondylolisthesis, and based my conclusions upon a careful study of the literature, the investigation of a comparatively large personal material, as well as upon experimental research. My investigations led me to define spondylolisthesis lumbo-sacralis as a gradual pushing forward of the last lumbar vertebra over the base of the sacrum, when the change might involve the vertebra *in toto* or only in its anterior half.

As a result of my studies, I held that any one of the following conditions might be considered *a priori* as etiological factors.

I. In olisthesis of the entire last lumbar vertebra.
  1. Developmental anomalies of the lumbo-sacral articular processes.

2. Destruction by disease of the lumbo-sacral articular processes.
3. Fracture of the lumbo-sacral articular processes.
4. Luxation of the lumbo-sacral articular processes.

In olisthesis of the anterior half of the last lumbar vertebra.

1. Developmental anomalies of the arch of the last lumbar vertebra.
2. Softening or destruction by disease of the arch of the last lumbar vertebra.
3. Fracture of the arch of the last lumbar vertebra.
4. Changes in form resulting from carrying excessive burdens.

t that time I was able to adduce personal cases in support
the correctness of several of these hypotheses, more par-
larly for I, 1 and 3, and also for II, 1 and 3. As far as
others were concerned, I was obliged to state that they had
n advanced merely as hypothetical or probable causes
he condition; as for example I, 4, but that their actual occur-
ce had not been demonstrated, nor did it appear likely
t conclusive evidence in their support could be adduced
he future. Moreover, I was able to show in another speci-
n of pronounced spondylolisthesis lumbo-sacralis that it
impossible to determine which factors had been concerned
ts production, when the synostosis at the displaced lumbo-
al juncture was far advanced. Likewise it seemed im-
tant to me to point out that, even when the existence of
of the causal factors just mentioned could be demon-
ted, it was necessary for excessive pressure on the part of
body weight to come into play in order for an olisthesis
evelop from the predisposing etiological condition.

n 1892 Neugebauer reviewed the entire literature upon the
ect, and considered all cases which had been either clini-
or anatomically described up to that time. As a result,
tated that the important etiological factors were spondyl-
s, which might be either congenital or the result of fract-
arthritis of the lumbo-sacral articular processes, and static
mation in the sense of Arbuthnot Lane. In the following
he was able to enlarge his previous list by 8 additional
al cases and 7 anatomical preparations, and he referred
cularly to the highly interesting communication of Ar-
ot Lane in 1893, in which was described an attempt to
spondylolisthesis, resulting from static deformation, by
ing the spinous process and the arch of the fourth lum-
ertebra. This case is of particular interest as it repre-
the first attempt to treat spondylolisthesis by surgical
res.

ing the following years a number of casuistical publi-
s appeared, and I would mention especially the work of
ns, who, in 1899, described both anatomically and clini-
a well-marked case of spondylolisthesis occurring in a
s resulting from a spondylolysis interarticularis of trau-
origin, and which he stated was the sixth case which
en described in America up to that time. Moreover, I
like to call attention to the publication of Lawrence in
who, after excluding the possibility of a lesion in continuity in the interarticular portions of the last lumbar vertebra being the etiological factor in his case, attributed it to imperfect development of the lumbo-sacral articular processes and of the arch of the last lumbar vertebra.

In 1900 Breus and Kolisko published their very thorough and systematic work upon spondylolisthesis, particularly from a pelikological point of view, to which I have already referred. Etiologically they considered that the typical factor in its production was spondylolysis interarticularis.

In 1905, I studied a new case of spondylolisthesis, in a 70-year-old woman, developing from congenital spondylolysis interarticularis of the last lumbar vertebra, and was able to demonstrate the presence of small accessory bones (Schalteknochen) in the space between the fragments of the left interarticular portion, just as I had repeatedly observed in simple congenital spondylolysis interarticularis without olisthesis. In 1901 Schwarte resuscitated the teachings of W. A. Freund, and contended that spondylolisthesis developing from congenital spondylolysis interarticularis was frequently due to the fact that the fœtal form of the pelvis had persisted, and consequently that the deformity was frequently of pelikogenous origin.

As the result of the many investigations concerning the etiology and pathogenesis of lumbo-sacral spondylolisthesis, I consider that it has been shown beyond peradventure that the etiological factor most frequently concerned is congenital spondylolysis articularis of the last lumbar vertebra. It has also been satisfactorily demonstrated that fracture of the interarticular portions of the last lumbar vertebra may sometime play a causal part, while occasionally, an unusually scanty development or fracture of the lumbo-sacral articular processes, as well as their involvement by arthritis, may be the predisposing cause.

When the lesion in continuity is limited to the interarticular portion of the last lumbar vertebra, only its anterior half glides forward, whereas the entire vertebra undergoes displacement in the other conditions. Moreover, when the vertebra becomes arrested in a certain location, the possibility must be considered that it may increase in length secondarily, in which event its body may later move further and further forward; just as we must admit that the flattening and lengthening of the interarticular portions of the last lumbar vertebra may be due to the action of undue pressure, as advocated by Arbuthnot Lane; but, personally, I consider it improbable that a marked olisthesis can develop in this manner. Spondylolisthesis occurring elsewhere than at the lumbo-sacral juncture is so very rare that it need not be considered at this time.

I believe that in the future our knowledge of spondylolisthesis will be advanced in great part by the study of pelves in which the anomaly is only slightly developed; as in them the etiological factors concerned can be much more clearly appreciated than in more advanced cases; since in the latter the presence of extensive synostoses may completely mask the underlying anatomical and etiological conditions. Such investigations will gradually place its etiology in a much clearer light, and will enable us to estimate more accurately the frequency with which the various factors come into play. They will also have to take into consideration, to a much greater extent than previously, the part played by trauma in the development of spondylolysis, as well as by the mode of life of the individual. Finally, they will teach us whether spondylolisthesis really occurs so much more frequently in females than in males, as seems to be indicated by the statistics thus far available.

In order to solve these problems, it will be necessary to search directly and systematically for spondylolisthesis in all pathological anatomical material. At every autopsy, whether upon male or female subjects, the region of the lumbo-sacral juncture should be carefully examined, and, whenever it appears to be more prominent than usual, the pelvis should be removed and subjected to accurate preparation with a view of determining the existence of spondylolisthesis. Moreover, we should study all pelvic preparations, which are preserved in museums, with this point in mind.

In this manner I was enabled to discover three slight cases of spondylolisthesis lumbo-sacralis in my work in Prague prior to 1892, one of them being due to imperfect development of the lumbo-sacral articular processes, while in 1905 I described a fourth case. In about 4000 autopsies (25 per cent of which were upon children) performed under my supervision during the past four years in Strassburg, I discovered three additional examples of early spondylolisthesis. Etiologically they were quite ordinary, in so far as the causal factor was spondylolysis interarticularis; but on the other hand they were of especial interest in that they all occurred in males.

Up to 1893, out of a total of 115 cases, Neugebauer found only 7 examples of spondylolisthesis in males, an incidence of 6 per cent; Williams, in 1899, only 8 in 123 cases, 6.5 per cent; and, up to the time of this communication I could collect only 9 cases in 144, 6.2 per cent. If, however, I add to them the three cases to which I have just referred, we find 12 male cases in 147, and thus raise the incidence to 8.1 per cent. This being the case, it would appear permissible to predict that even in the male sex spondylolisthesis occurs much more frequently than is generally believed, and therefore the male pelvis must be examined with particular interest in this regard.

In this connection it is important to note that up to the present time all cases of spondylolisthesis occurring in males were only of slight degree, but whether this is due to the greater strength of the ligamentous structures and the more pronounced development of the musculature in that sex I am not yet prepared to state.

I shall now pass on to the description of my three new cases.

Case 1.—Museum specimen 6769 (Figs. 1 and 2). This specimen was obtained from a 70-year-old, very strongly built, peasant, 167 cm. in height, who died March 7, 1910, from embolism of the pulmonary artery. On removing the viscera from the abdominal cavity at autopsy, a marked protuberance was noted at the lumbo-sacral junction. Accordingly, after counting the normal number of cervical, dorsal and lumbar vertebræ, the pelvis was removed from the body and carefully prepared. On examination it was found that the spinous process of the 24th vertebra projected about 1 cm. further posteriorly than those of the other lumbar vertebræ, while its body was pushed forward to the same extent beyond the body of the 25th vertebra. A somewhat flattened exostosis 4 to 5 cm. broad extended from the anterior surface of the body of the 24th vertebra, principally to the left of the middle line, and was firmly united to a similarly formed exostosis of the superior border of the 25th vertebra by means of fibrous tissue. Moreover, a lip-like hyperostosis was present on the adjacent antero-lateral margins of the 24th and 25th vertebræ, while the intervertebral cartilage between them was markedly reduced in size.

On studying the relations of the 24th to the 25th vertebra it was seen that the body of the former had advanced 1 cm. in front of the posterior border of the upper surface of the latter and that both interarticular portions of the 24th vertebra presented a symmetrical spondylolysis interarticularis; the ends of the bone being smooth and about 1 cm. distant from one another while the intervening space was filled by ligamentous structures thus accounting for the increased length of the vertebra. The 25th vertebra presented signs of lumbo-sacral assimilation and was separated from the 26th by an intervertebral cartilage 8 mm. in thickness, while its alæ were only very slightly developed. On the right side, a suture separated the ala of the 25th from the normally developed ala of the 26th vertebra, while on the left side the two alæ were synostosed together; although a depression in the bone indicated their original union. Anteriorly and to the right, between the bodies of the 25th and 26th vertebræ, was a button-shaped exostosis, 4 cm. broad, 2 cm. long and 1.5 cm. high, which served to bind the two bones together. The spinous process of the 25th vertebra was split into a right and left half. The 26th vertebra was otherwise normal; as were also the 27th, 28th and 29th vertebræ. The 30th, however, appeared to be entirely assimilated to the sacrum and below it were three well-marked coccygeal vertebræ. Either side of the sacrum presented 5 sacral foramina, while the sacral hiatus gaped from the 28th vertebra downward. The sacro-iliac joints were not synostosed, and their anterior margins were lip-like. The inclination of the pelvis appeared somewhat less than normal and its bones were all strongly built and the acetabula were of moderate depth.

The pelvis presented the following measurements: Distance between iliac crests, 27.5; between anterior superior spines, 25.5; and between superior posterior spines, 8.5 cm. Superior strait: Conjugata vera, 10.5 cm.; transverse diameter, 12.5 cm.; right oblique, 12.5 cm.; left oblique, 12 cm.; right and left sacro-cotyloid diameters 8.2 and 7.8 cm., respectively. Plane of greatest pelvic dimensions: Conjugata, 13 cm. (extending to the junction between the 27th and 28th vertebræ); transverse diameter, 11 cm. Plane of least pelvic dimensions: Conjugata, 11.5 cm. (extending to the lower end of the 30th vertebra); distance between ischial spines, 9 cm.; distance between tubera ischii, 6.5 cm.

The sacral portion of the innominate bone was 8 cm. on each side (measured with a pelvimeter); the iliac portion was 6.4 cm. on the right and 5.5 cm. on the left side (tape measure), while the pubic portion measured 7.9 cm. on both sides. The sacrum measured 14 cm., from the upper margin of the 25th to the lower margin of the 30th vertebra, and 11.2 cm. in width.

From the study of this case, it appears that we have to do with a pelvis presenting a slight spondylolisthesis of the 24th vertebra resulting from an apparently congenital bilateral interarticular spondylolysis. This was combined with a lumbar assimilation of the 25th vertebra, and it is very interesting to note how this condition brought it about that the hypersynostotic processes, resulting from the olisthesis, involved not merely the junction between the 24th and 25th vertebræ, but also that between the 25th and 26th. The development of olisthesis in this case from the spondylolysis interarticularis may be explained by the hard labor which the man was obliged to perform, while further slipping

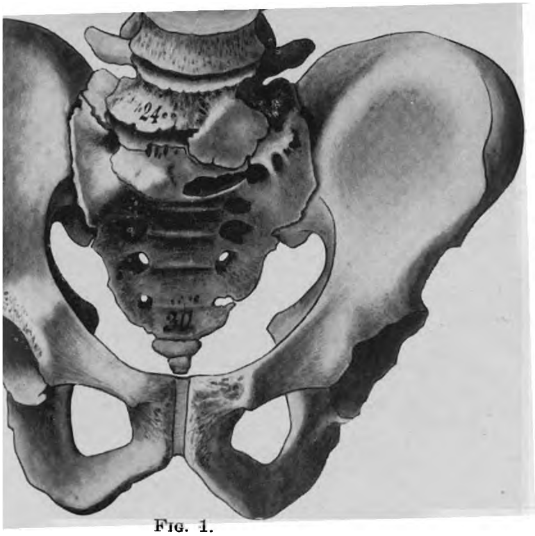


FIG. 1.

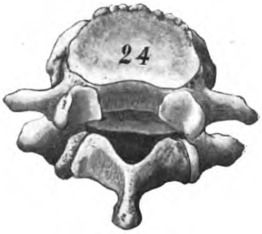


FIG. 2.

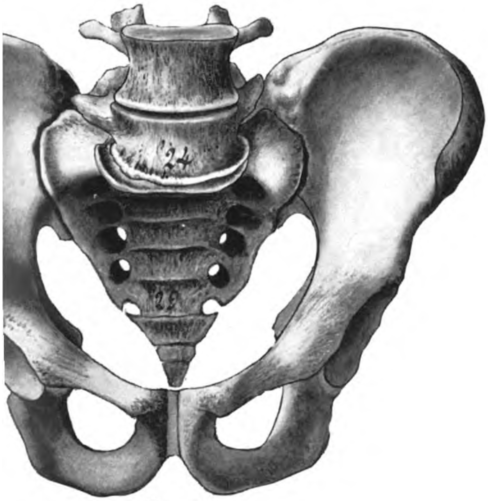


FIG. 3.

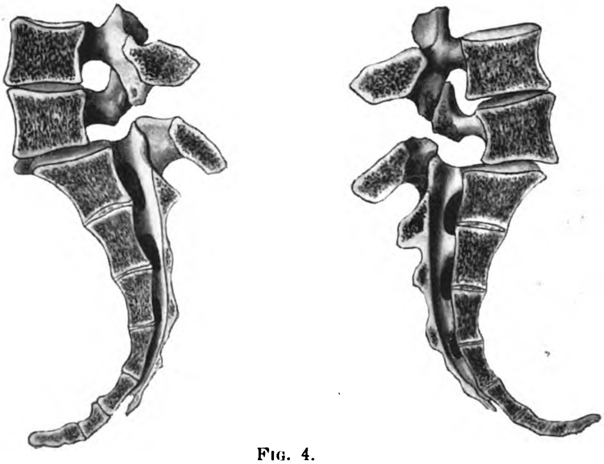


FIG. 4.

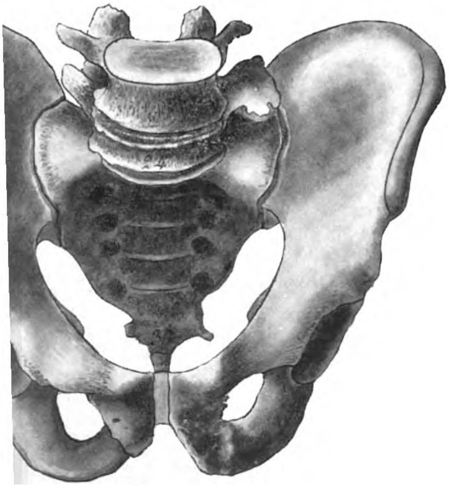


FIG. 5.

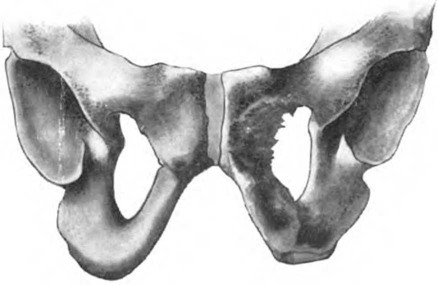


FIG. 6.

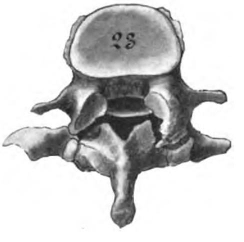


FIG. 7.

2.—Spondylolisthesis lumbo-sacralis e spondylolysi interart. cong. vert. lumb. V. Assimilatio lumbalis vert. sacr. I
s. 6709. Male 70a.
4.—Spondylolisthesis lumbo-sacralis e spondylolysi interart. cong. vert. lumb. V. Strassburg. Mus. 6628. Male 55a.
nd 7.—Olisthesis vertebræ lumb. IV e spondylolysi interarticulari fracturosa. Strassburg. Mus. 6651. Male 55a.

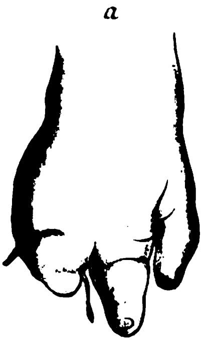


FIG. Ia.

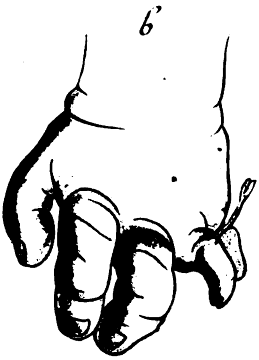


FIG. Ib.

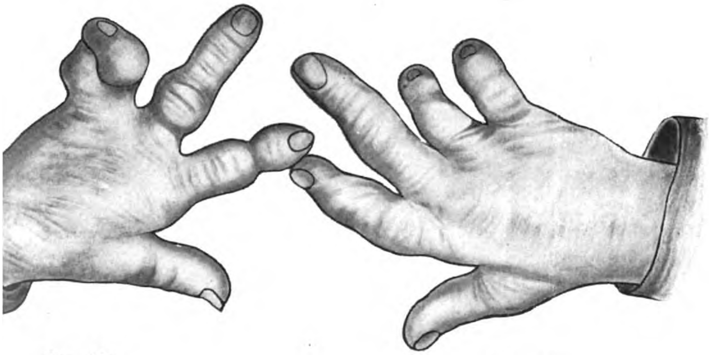


FIG. IIa.

FIG. IIb.

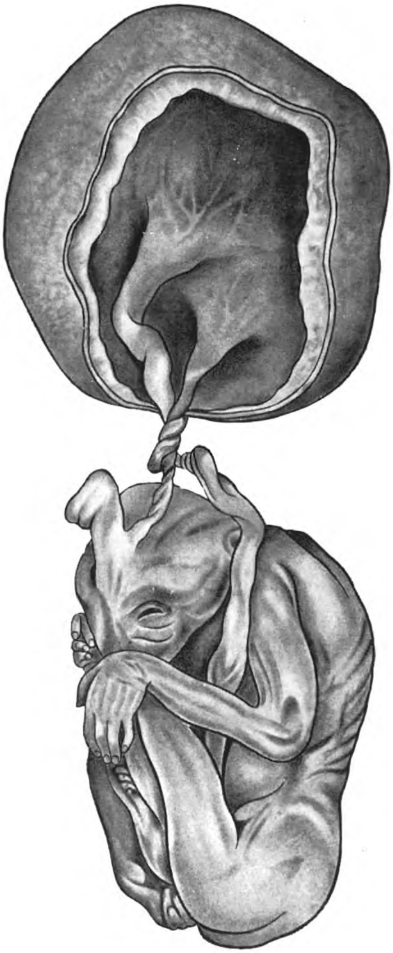
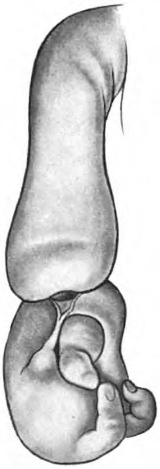


FIG. IV.



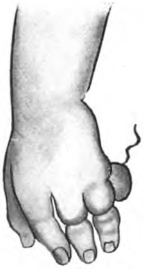


FIG. IIIb.

FIG. IIIa.

FIG. Ia, b.—Pero- et Syndactilia ligamentis amniotis effecta. Fœtus, 9 mens. Prag. Mus. 4943.
FIG. IIa, b.—Perodactylia ligamentis amniotis effecta. Female 70a. Prag. Mus. 5543.
FIG. III.—Ligamenta amniotica. Kind 3 hor. Prag. Mus. 5377.
FIG. IV.—Adhæsio amniotica interplacentam et caput fœtus papyracei. Prag. Mus. 5105.

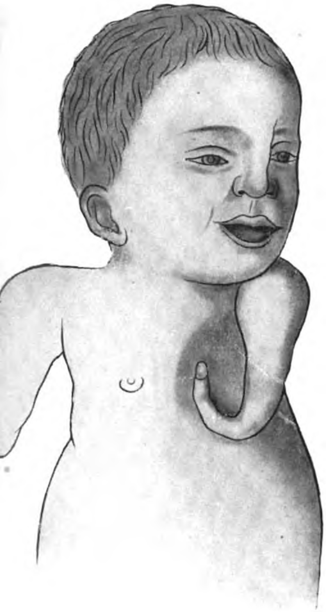


FIG. VIII.

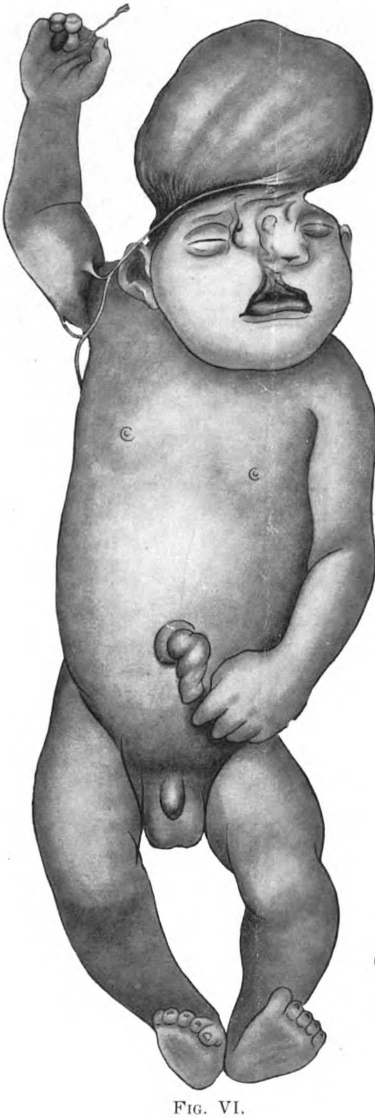


FIG. VI.

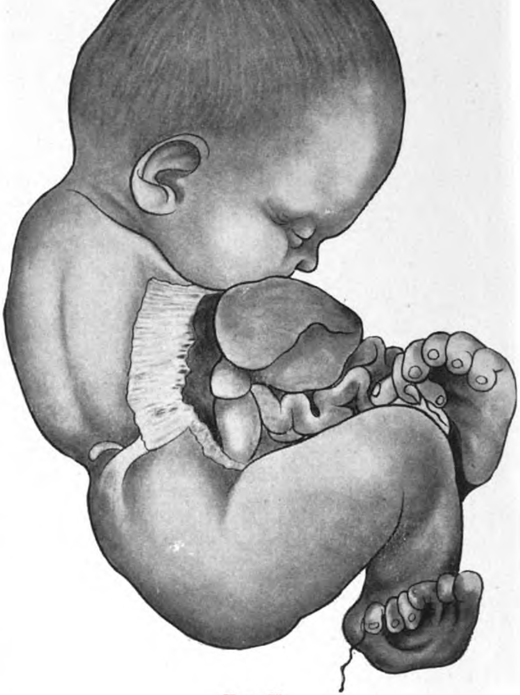


FIG. V.

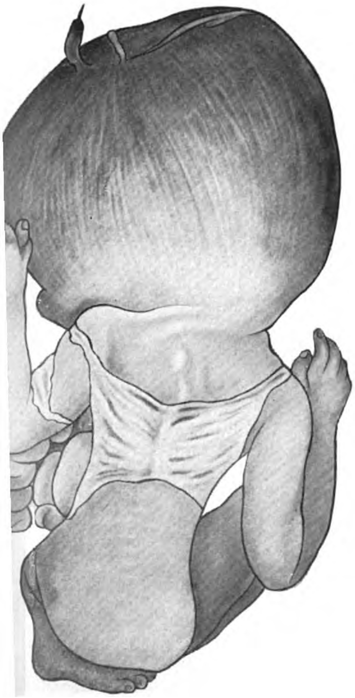


FIG. VIIa.

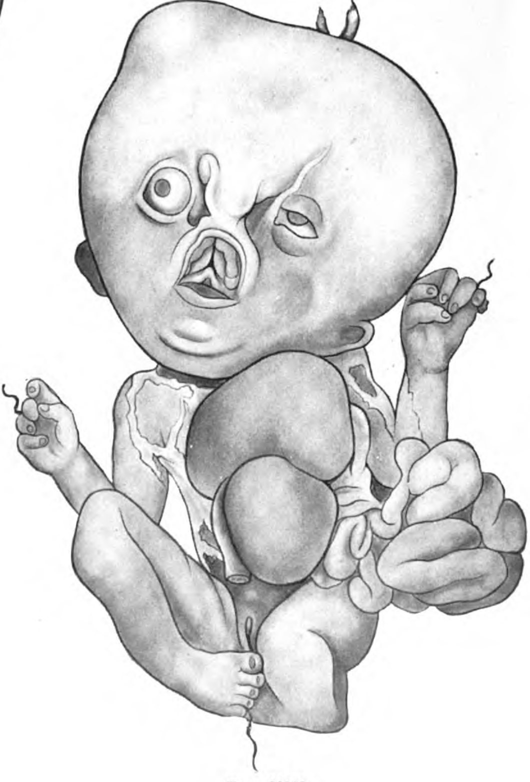


FIG. VIIb.

FIG. V.—Schizosoma cum defecta extr. s. d. Fœtus, 38 cm. Prag. Mus. 5610.
FIG. VI.—Enkephalokele. Prosoposchisis. Ligamenta amniotica. Strassburg. Mus. 1922.
FIG. VIIa, b.—Schizosoma. Prosoposchisis. Ligamenta amniotica. Involucrum amnioticum thoracis. Prag. Mus. 5490.
FIG. VIII.—Perobrachia sin. prob. amnio effecta. Male, 4 mens. Prag. Mus. 2417.

was arrested by the development of secondary ex-
t the bodies of the vertebræ.

-Museum preparation 6628 (Figs. 3 and 4). This
ound in a 55-year-old laborer whose corpse was drawn
Rhine, May 23, 1909. The body was very strongly
lumbo-sacral junction was very prominent, particu-
right side, while the normal number of vertebræ
t in the cervical, dorsal and lumbar regions. On
the sacrum presented four foramina and the first
rtebra (the 30th), was typically caudal in character.
ting the pelvis from behind, it was seen that the
ess of the fifth lumbar vertebra projected 1 cm. more
han the corresponding processes of the other lumbar
he continuity of the interarticular portions of the
vertebra was broken on either side, exactly mid-
the upper and lower articular processes, and their
gins gaped to the extent of 1 cm. The body of the
had advanced to the same extent over the upper sur-
body of the first sacral vertebra. Following the
perostoses had developed upon the anterior and in-
n of the body of the fifth lumbar, as well as upon
and superior margin of the body of the first sacral
he hyperostoses were 1 cm. high on the right side,
t lower on the left, and a prolongation of the last
l cartilage extended between them. The bodies of
sacral vertebræ were fused together in the usual
the sacral canal appeared to be closed as far as
iddle of the 28th vertebra. The pelvic inclination
ghtly diminished, while the bones of the pelvis ap-
fully developed and free from any sign of injury.
surements: Distance between iliac crests 25.7 cm.;
rior superior spines 23 cm. and between superior
nes 6.5 cm. The superior strait presented the fol-
urements: Conjugata vera, 10.2 cm.; transverse
7 cm.; right oblique, 12.2 cm.; left oblique, 12 cm.;
otyloid, 7.6 cm., and left sacro cotyloid diameter
of greatest pelvic dimensions: Conjugata, 12 cm.;
3 cm. Plane of least pelvic dimensions: Conjugata,
ance between ischial spines, 10.2 cm. Pelvic outlet:
een tubera ischii, 11 cm. On either side, the sacral
innominate bone measured 6.7 cm.; the iliac por-
nd the pubic portion 7 cm., while the sacrum was
th and 11 cm. in width.

nce the predisposing cause for the spondylolisthesis
he same as in Case I, and we likewise had to do
ubtedly congenital spondylolysis interarticularis of
the fifth lumbar vertebra, from which the olisthesis
eloped. At the time of death the olisthesis was
leveloped, but it would in all probability have in-
nt had the individual lived; since, in the absence
on of synostoses, no mechanism existed to check
g.

useum specimen 6651 (Figs. 5, 6 and 7). This
ained from a 55-year-old peasant who committed
ging, August 9, 1909. The history gave no inti-
existence of any abnormality on the part of the
n, and the skeleton was tolerably strongly built.
he viscera at autopsy, it was noticed that the
the fourth and fifth lumbar vertebræ was more
usual, and also that the left transverse process
bar vertebra was very wide.

ful examination, it was found that a slight olis-
tent of 1 cm. had occurred, so that the body of
ar vertebra projected over the anterior margin of
was made possible by a spondylolysis in both
rtions of the fourth lumbar vertebra. The lower
rtebra was drawn out in a lip-like manner, more particularly in its anterior portion, which was united by ligamentous structures with a similar lip-like hyperostosis, about 1 cm. thick, arising from the anterior and upper margin of the body of the fifth lumbar vertebra.

The separation in continuity in the interarticular portions of the fourth lumbar vertebra lay somewhat more posteriorily on the left than on the right side. On the right side it extended between the lower and middle third of the joint surface of the upper articular process, while on the left side it extended only through the lower end of the upper articular process. An irregularly bowed bony process extended from the upper articular process on the right side and grasped like a claw the corresponding interarticular portion. The two fragments of the vertebral arch of the fourth vertebra lay about 1 cm. apart and the intervening space was filled with ligamentous structures.

As compared with the spinous processes of the third, second and first lumbar vertebræ, that of the fourth vertebra was very prominent. The fifth lumbar vertebra presented no lesion in continuity in the interarticular portions, but the inferior margin of its body, like the upper margin of the first sacral vertebra was somewhat hyperostosed. The right transverse process of the former appeared normal, but on the left side there was a bony plate about 3 cm. in diameter and concave below, which was firmly united by ligamentous structures with a correspondingly formed protuberance arising from the upper surface of the left wing of the first sacral vertebra.

The sacrum was made up of six vertebræ of which the sixth was formed by the 30th vertebra, which was definitely assimilated to the sacrum, below which came three fused caudal vertebræ. On the left side of the 29th and 30th vertebræ there was an irregularly formed, jagged exostosis, while the entire left half of the former appeared to be irregularly hyperostosed. Four sacral foramina were present on either side. The ilio-sacral joints were open and their anterior margins somewhat hyperostosed. The pelvic inclination appeared normal. The descending ramus of the right pubic bone presented a fracture, which had healed with a perceptible hump, while the ascending ramus of the left ischium likewise presented a fracture, which had healed by hyperostosis.

Pelvic measurements: Distance between crests, 23.5 cm.; between anterior superior spines, 20.5 cm.; between superior posterior spines, 7 cm. Superior strait: Conjugata vera, 9.3 cm.; transverse diameter, 15.5 cm.; right oblique, 11.2; left oblique, 11.2 cm.; right sacro-cotyloid, 9 cm.; left sacro-cotyloid, 9 cm. Plane of greatest dimensions: Antero-posterior diameter, 11.5 cm.; transverse, 10.5 cm. Plane of least pelvic dimensions: Antero-posterio diameter, 11.5 cm.; distance between ischial spines, 8 cm. Pelvic outlet: Distance between tubera ischii, 8 cm. On either side, the sacral portions of the innominate bone measured 7.5 cm.; iliac portions, 6 cm., and pubic portions, 6 cm. The sacrum was 12 cm. in height and 11 cm. in width.

In this specimen, the olisthesis of the fourth lumbar vertebra was likewise the result of a spondylolysis interarticularis. Leaving out of consideration the fact that the olisthesis involved the fourth lumbar vertebra, I consider that the interesting feature of the case is the probability that the spondylolysis interarticularis could be attributed to a fracture. This would seem to be borne out by the irregular outline of the separation of the interarticular portions, which on the right side extended through the superior articular process itself, and in addition by the presence of undoubted traces of fracture on the anterior wall of the pelvis and the lower end of the sacrum. The hyperostosis of the left transverse process of the fifth lumbar vertebra, as well as that of the left ala of the first sacral vertebra might also have resulted from a fracture, but I consider it more likely that they are secondary processes resulting from the olisthesis.

Therefore, I believe that this man had sustained a fracture of

the pelvis, involving the arch of the fourth lumbar vertebra, from which the spondylolisthesis had gradually developed, while fixation had not occurred up to the time of his death. It is greatly to be regretted that a history of the case is entirely lacking.

RECENT LITERATURE UPON SPONDYLOLISTHESIS.

Bohn: Ein neuer Fall von Spondylolisthesis. Diss. inaug. Berlin, 1892.

Brandenberg: Ein Fall von Spondylolisthesis mit Missbildung des Kreuzbeins. Ztschr. f. orthop. Chir., 1908.

Braun v. Fernwald: Ein Beitrag zur Kenntnis des spondylolisthetischen Beckens. Arch. f. Gynäk., 1896.

———. Wiederholter Kaiserschnitt in einem Falle hochgradiger Spondylolisthesis. Centralbl. f. Gynäk., 1898.

———. Weitere Erfahrungen über das spondylolisthetische Becken. Arch. f. Gynäk., 1899.

Breus & Kolisko: Die pathologischen Beckenformen, 1900.

Buchheister: Geschichte der Aetiologie der Spondylolisthesis. Diss. inaug. Strassburg, 1894.

Chiari: Die Aetiologie und Genese der sogenannten Spondylolisthesis lumbosacralis. Ztschr. f. Heilk., 1892.

———. Ueber ein neues spondylolisthetisches Becken. Prag. med. Wchnschr., 1905.

Engström: 3 klinisch beobachtete Fälle von spondylolisthetischem Becken. Mitth. a. d. gynäk. Klin., Helsingsfors. Centralbl. f. Gynäk., 1904.

Herzfeld: Ein Fall von spondylolisthetischem Becken. Allg. Wien. med. Ztg., 1892.

Hübl: Fall von Spondylolisthesis. Centralbl. f. Gynäk., 1896.

Jellinghaus: Ein neuer klinisch beobachteter Fall von Spondylolisthesis. Arch. f. Gynäk., 1896.

———. Zur Casuistik des spondylolisthetischen Becken. Ibidem, 1898.

Lane, Arbuthnot: Case of spondylolisthesis associated with progressive paraplegia. Laminectomy, Lancet, 1893.

Lawrence: The re-description of the specimen of spondylolisthesis in the Museum of University College. Trans. Obs. Soc. London, 1900.

Neugebauer. Spondyl-Olisthesis et Spondyl-Izème. Paris, 1892.

———. Bericht über die neueste Casuistik und Literatur der Spondylolisthesis. Zentralbl. f. Geburtsh. u. Gynäk., 1893.

Olshausen & Veit: Schroeder's Lehrb. d. Geburtsh., 1902.

Schütte: Demonstration eines Uterus mit frischer Kaiserschnittsnarbe; Operation wegen Spondylolisthesis bei septischer Periotnitis. Centralbl. f. Gynäk., 1898, u. Monatsschr. f. Geburtsh. u. Gynäk., 1898.

Schwarte: Aetiolige und Genese der Spondylolisthesis. Diss. inaug. Strassburg, 1901.

Sonntag: Die Pathologie der knöchernen Beckens. v. Winckel's Handb. d. Geburtsh., 1905.

Wedekind: Ein neuer klinisch und anatomisch beobachteter Fall von Spondylolisthesis. Diss. inaug. Halle, 1897.

Williams: A case of spondylolisthesis, with description of the pelvis. Am. Gyn. Trans., 1899.

ON DIABETIC ACIDOSIS.*

By Prof. A. Magnus-Levy, Berlin.

What do we understand by the term acidosis, a name first employed by Naunyn? Acidosis means the *accumulation* of acids in the body, in sharp distinction to the *formation* of acids which are produced, indeed, in every moment of normal life. In the normal metabolism substances of acid or alkaline properties are continuously being formed, but the tendency of metabolism is towards their neutralization. Probably all acids, which we encounter in pathological states, are produced as intermediary products in the normal change of matter. We know this to be true of uric acid, of oxalic acid and of glycuronic acid, etc.; we may assume it of homogentisic acid, of oxybutyric acid and of others. We, therefore, are not justified in defining acidosis, simply as a formation or as an appearance of acids which do not occur in normal health.

The accumulation of acids, the essential character of acidosis, presupposes in each case a disturbance of oxidation. Whether, besides the disturbed oxidation an increased formation of acids is present in acidosis is another question, and must be answered separately in each single case. (If homogentisic acid is a regular intermediary product in the katabolism of phenylamine and tyrosine, as some authors believe, its quantity will depend merely on the amount of katabolized albumen. The alcaptonturic individual will not produce larger quantities of this acid than a healthy person, but in the normal individual total combustion of the intermediary products takes place, while in the alcaptonuric patient the acid is neither split up nor oxidized.)

Similarly with oxybutyric acid, the principal subject of this lecture, we must consider whether it is formed in a larger amount in diabetes than in normal life.

Besides these that I have mentioned, other acids occur as results of metabolism, such as lactic acid, volatile fatty acids, higher fatty acids, amygdalic acid and carbonic acid. Some among these display specific effects, even when present only in small quantity, as does uric acid, oxalic acid and perhaps the lower fatty acids. These specific effects do not come under the term of acidosis, which simply means the general result of acidification. This, indeed, takes place only when acids accumulate in very large quantities, such as are sufficient to disturb by their acid character the processes taking place in the organism. If we leave out of question the end product of all oxidation, carbonic acid, which has scarcely the character of an acid, only one acid remains, to which we may apply the name of acidosis in the above sense. This acid is the oxybutyric acid and dependent upon it diacetic acid. Whether besides this group another kind of acidosis occurs in pathology, namely, an acidosis produced by lactic acid, as yet seems doubtful.

You are all aware of the fact that oxybutyric acid undergoes oxidation into diacetic acid, and that from the latter acetone can be formed. It is hardly necessary to speak at length of the latter body, which has been the subject for intensive re-for many years. Two authors, Folin and Embden, ıd simultaneously that the acetone present in the urine is eliminated as such at all, or only to a small part. It is a luct of self-disintegration of the diacetic acid transferred he kidneys from the blood into the urine. The acetone, which is exhaled by the lungs, is not present in the blood uch, but occurs in the form of diacetic acid.

---

* Paper read before the Johns Hopkins Hospital Medical Society, May 9, 1910.

henever tests for acetone are positive, we should consider etic acid to be present. The name acetonuria, still in use, be used as synonymous with acidosis. The strong and acteristic smell of acetone in the expired air is an excellent le for its diagnosis. With a subtle sense of smell one is to observe the presence of acidosis and even to differentiate intensity. In my experience the smell of acetone is ob- ed in almost every tenth patient entering the hospital. I ld like to emphasize here that acidosis is a very common ırrence. Acetone bodies, which is a comprehensive name oxybutyric acid, diacetic acid and acetone, are temporarily ıed in almost all diseases. Several, even numerous, forms cidosis or, as one called it formerly, acetonuria, have been ribed. But all these forms are identical when considered ı an etiological standpoint and are all to be classified under same head. In general, acetone bodies are eliminated ıys when carbohydrates are lacking in the organism, or, n they are not utilized in a normal way. Under these litions, indeed, the oxidation of protein and of fat will be ient and oxybutyric acid will appear in the urine. Acid- will occur *every time,* when from any reason, the taking ood and especially of starch and of sugar, sinks to a imum.

his applies to all kinds of acetonuria—to the acetonuria ı starvation or from exclusive animal food, to the ace- ria in fever, in gastro-enteritis and to the acidosis appear- in the latter stages of cancer. Only upon one point do we remain in doubt, whether besides the absence of carbohy- , there exist *other* circumstances, which, although they ot induce acidosis, yet may increase and modify it. Practi- this question is rather irrelevant, and I think it an un- sary discussion of the subject. Another question is of far er importance, and that is the difference between diabetic ıon-diabetic acidosis. Except in diabetes the elimination etone bodies rarely exceeds 10 or 15 grams, and when quantities appear in urine, they do so only for a short in diabetes, on the contrary, the elimination may reach) and more grams, and acidosis of this height may last onths and even for years. We know this fact since the eighties, a period when we did not yet employ alkalies.

e I would like to call your attention to the very im- t deduction, that a patient with severe diabetes, and very marked acidosis, may, under favorable circum- , live for years without suffering *immediate* damage to lth. He is, it is true, according to Frerich's words, d by the danger of a certain and unexpected death, is end may not be reached for many years. And nger is imminent only in the *diabetic* patient, whose for utilizing carbohydrates is extremely weakened. When the interest in acidosis became general among practitioners, when the Legal-Gerhardt test, so often positive, revealed the frequency of strong acetonuria in non-diabetic diseases, a feeling of apprehension arose. The bad prognosis which persistent and marked acidosis gives in diabetes was transferred without reason to acidosis existing in diseases other than diabetes. But acidosis never is a threatening danger in *such* patients. Acidosis as such has nothing to do with the symptoms and with the dangers of such diseases. The idea of the specialists in children's diseases was wrong, who, in studying the acidosis which occurs in the alimentary disturbances of nursing babies, ascribed the cachexia and death of the children to oxybutyric acid.

Furthermore, in diabetes acidosis, even when it has lasted for years, induces no *immediate* harmful consequences. Thus acidosis, which exists other than in this disease, being far weaker and of short duration, is without clinical interest and without prognostic value.

You are aware that the human organism, as well as that of carnivorous animals, defends itself against the action of accumulated acids by forming an alkaline body, ammonia. A diabetic patient at any time has at his disposal 6 or 8 grams of ammonia. The neutralization of acids by ammonia prevents deprivation of alkalies and a change in the alkalinity of the most important cells. With 6 or 8 grams of ammonia, 40 or 50 grams of oxybutyric acid can be eliminated month after month, without acidosis becoming deleterious. A *fatal acid-poisoning* will occur only then, when the accumulation of the acids reaches twice or three times these amounts. There is a difference between *acidosis,* spoken of in the common sense, and a *fatal* acid-poisoning, a difference which though only in the quantity of acids, yet cannot be emphasized strongly enough. Outside of diabetes, such an enormous rise of the accumulation of acid never takes place, so far as we know at present. The coma produced by it is limited to diabetes and merits the name of coma diabeticum.

Stadelmann, a pupil of Naunyn, was the first, as you well know, to consider diabetic coma to be a fatal acid poisoning. He compared it to the experimental poisoning by muriatic acid in experiments with animals. According to Walther's fine discovery, rabbits, after having been given 0.9 gram of HCl per kilo of body weight within 24 hours, die in a comatose state. The striking analogy between this form of acid poisoning and that of diabetic coma, emphasized by Stadelmann, exists in the similarity of the clinical symptoms, especially the changed and deepened breathing, further in the strongly diminished quantity of carbonic acid of the venous blood, together with the diminution of the alkalies as determined by titration. Aside from these symptoms the occurrence of ammonia in the urine is common also to both states. One link alone was missing in the chain of proofs furnished by Stadelmann. It had not yet been demonstrated that such an amount of acid, as was necessary to bring about the death of the rabbit, was present in a case of human diabetes. The *urine* of comatose diabetic subjects not only contained no larger amount of organic acid, but rather less than in the time preceding the coma. With one exception this quantity did not exceed 20 grams. That is the reason the theory of Stadelmann was doubted. The total quantity of acid found in any given case *appeared* insufficient.

A mistake had been made, however, in looking for their presence in the *urine* of deceased patients; it would have been just as much of an error to have looked for muriatic acid in the urine of dying rabbits. The lessened alkalinity of the kidneys diminishes the secretory power, the stream of urine decreases rapidly, sufficient elimination of the acid either ingested in an experiment, or formed within the body of a diabetic patient does not take place. Both the poisoned animal and the diabetic patient do *not* die from the acid which has been *eliminated* in a neutralized state, but from the acid which *remains in the body*. The presence of the acids was not to be looked for in the *urine*, but in the *organs* of the corpse. By laying stress upon this point of view I really have been able to find in the body by analysis of blood, liver, muscles, etc., quantities of 100 to 200 grams of oxybutyric acid. Calculated per kilogram and allowing for differences in molecular weight, these amounts are just as large, and even larger, than those which induced the death of Walther's rabbits.

In the urine also enormous quantities may be found, but only if the patient survives the comatose state, so that the elimination of acids takes place in a sufficient way. I was lucky enough to establish this fact in a boy under the care of my teacher, Naunyn. This boy, only 30 kilograms in weight, underwent a most severe coma, but was saved by the use of almost 200 grams of sodium bicarbonate in 24 hours. On this day the urine contained 160 grams of acetone bodies; the following days the elimination sank to a lower level.

In the experimental poisoning by acid, there exists an *experimentum crucis,* which proves the death to be really due to the action of the acid itself and not to secondary factors. If the acid circulating in the body is neutralized by intravenous injection of bicarbonate of soda, improvement follows immediately even when death seems to be imminent in the very next minutes. This *experimentum crucis* has succeeded also in diabetic coma, though only seldom, just as it was postulated by Stadelmann. I myself have seen three cases survive pronounced coma by use of bicarbonate of soda, two of them being children, one a patient of sixty years.

Here in America the doctrine of Stadelmann-Naunyn was well received and also it has been developed farther. In Germany, too, it has been acknowledged more than formerly since the new proofs have been furnished. According to my personal opinion, scarcely any other theory upon the entire field of metabolic science has better support and has been worked out more thoroughly both qualitatively and quantitatively. Yet it is proper that all objections which have arisen against it in the course of years should be considered carefully.

Four objections are to be named. The first one is the relative inefficiency of the alkaline treatment. It must be conceded that only few cases are known, in which an advanced diabetic coma has disappeared under the use of bicarbonate of soda, in contrast to the *absolute* efficiency of alkalies in the case of the rabbit. But it must not be forgotten that there is a marked difference between acid poisoning in experiments and in coma. In the first a certain limited and well-known amount of acid is introduced into the organism; when this quantity has been neutralized by the once-administered bicarbonate of soda, danger is over at once and will not reappear. During diabetic coma, on the other hand, the formation of acid does *not stop a moment;* new molecules enter continuously into the metabolism, to such a degree that the ingestion of bicarbonate of soda does not keep step. In order to neutralize 150 grams of oxybutyric acid, formed in the course of 24 hours, a quantity of 120 grams of bicarbonate of soda is required. Even when absorbed, the arrival of the alkali at the nervous centers of the brain and its utilization there is by no means to be taken for granted in every case. Only when the immense production of acids diminishes, or rather if oxidation takes place again—which, however, is not the case, as long as coma is at its height—will the alkalies ingested be sufficient to neutralize the acids. The urine then becomes alkaline and the diabetic patient will survive the coma. This quantitative calculation reveals why bicarbonate of soda therapy fails so often in advanced coma, but at the same time it is obvious that this failure does not contradict the theory of Stadelmann.

The second objection to be mentioned seems to be of more importance. It arose from the modern theories of acidity and alkalinity. Since acidity and alkalinity have been defined by the teachings of physical chemistry as the degree of concentration in hydrogen and hydroxyl ions, it has been pointed out that the fluids and the secretions of the body are fairly neutral if measured with this measure, with the single exception of the gastric and pancreatic secretions. The amount of hydroxyl and hydrogen ions in the blood serum does not undergo marked variations either in the various conditions of normal life or in illness. Even in the acid-poisoning of rabbits only a slight derangement of the neutral point of the reaction occurs and a slight decrease in the alkalinity takes place. In diabetic coma, however, such a decrease has not been found. Silli and Benedict, who carried out these experiments, therefore, deny any analogy between diabetic coma and the experimental acid-poisoning. They deny that the former comes under the head of acid-poisoning.

But their argument does not hold good. Besides other objections, which could be made, the main difference lies in the fact that Benedict, unlike Walther, did not inject the muriatic acid into the *stomach* of the animals, but introduced it in the form of a continuous stream into the veins. The blood was mixed with the acid fluid directly, without the latter having been passed through the walls of the intestines, and the intravenous injection was continued until death. Under these circumstances the actual concentration of ions at the moment of death, of course, is higher than that, which would have been reached if the acid had entered slowly and evenly from the stomach into the blood. I think, if the acid-poisoning had been produced in the same manner, as in Walther's experiments, the alkalinity of the ions would have been the same as in diabetic coma; in other words, that here also the quantity yl ions would not have been distinctly diminished.

rt from these objections there is still another difference veen experimental poisoning and diabetic coma. In the nple of the rabbit the acid enters first the blood and only r that the cells; in the diabetic patient, on the contrary, acids are actually produced in the cells themselves, and a fraction of the total quantity enters the blood. Thus the same degree of change of alkalinity in the nerve ers, upon which depends the death of the organism, the ease of alkalinity of the blood will be greater in the animal in the human patient. Death in both is not to be conred simply as a consequence of the changed reaction of the *d*, but in reality as due to the poisoning of the *vital center*, which in particular are meant especially the respiratory ers.

t is to be regretted, that we are still unable to measure the linity of the *organs* themselves. But in spite of this lack have complete evidence of the influence of acids upon what aking place in the organism. I will give you a striking nple from the field of normal metabolism. The production ven small quantities of lactic acid in the working muscles, their entrance into the blood will excite the breathing er, although in this case, on account of the *small* amount cids brought into play, no change in the ionic concentration he blood occurs. This excitement of the respiratory cen is to be compared with the far stronger irritation occur in coma. I will remind you also of the dreaded casts in urine, which suddenly appear in many cases before the reak of the coma. I believe them to be acid casts, and I k that they indicate a local decrease of alkalinity in the neys, whilst the alkalinity of the blood and of the vital n centers is yet normal.

o sum up the objections regarding the state of reaction in rganism I would say that alkalinity, in the sense of physichemistry, and alkalinity in the common language of iistry and of biology, are by no means identical. When is no change in the ionic concentration, lessened alkalin the biological sense may be present and may be of greatnportance.

o older objections to Stadelmann's theory are mentioned y more rarely than in former times, but even to these leration must be paid. Sometimes a comatose state was ntered in diabetic patients, who did not show any signs e acidosis. Neither the deepened breathing was present as the amount of carbonic acid in the blood diminished; alysis of the urine failed to give oxybutyric acid. Upon observation of the clinical symptoms *these* comatose s have proved to be phenomena of a different order. A c may die quite as well of uræmic coma or of epileptic and even the weakness of the heart may be accompanied ort of coma. These forms of coma have nothing in n with the dyspnoic form of coma save unconsciousness. itical eye of the clinician has little difficulty in recog them. Objections of this kind seldom are met with at

he other hand, there have been observed symptoms of dyspneic coma in non-diabetic diseases. I have seen myself such a dyspneic coma only once and then in a uræmic patient;[*] but older authors of the eighties affirm that it was by no means exceptional in *uræmia* and in *fever*. Here also a diminution of carbonic acid in the blood and of the titrated alkali occurs similar to that in diabetes. Since the comatose state in nephritis and diabetes have at least two symptoms in common, must we consider that acid-poisoning is present also in uræmia? And is fatal acid-poisoning a symptom which is not specific for diabetes? Also in infectious diseases similar changes of the alkalinity are held to have been found. Of all the objections against the doctrine of Stadelmann, I believe *this one* to be the most important. A full contradiction and definite refutation of this objection—I own it frankly—is as yet not possible; no detailed description of the clinical symptoms is given in the older observations which have been published, and the method of measuring the alkalinity has generally been inadequate. No attention has been paid any more to such events for 20 years, and I myself, though highly interested in the subject, have not had occasion to make researches upon this point, either clinical or experimental. But I am inclined to believe that a certain kind of *weak* acidosis could be in play here too. It is conceivable that lactic acid may have accumulated within the body of uræmic or infected patients. New inquiries on this point are needed. It should also be determined, whether acids are stored up in the tissues of such patients in the same way as in diabetic coma. Although one should be cautious in predicting the results of future investigations, I will express my opinion that neither of these lines of research will reveal the existence of a true acidosis in nephritis, *fully* corresponding to diabetic acidosis. Even should an accumulation of lactic acid be found, there will be a difference in its intensity. Although certain symptoms of acidosis as lessened alkalinity of the blood and deepened breathing may be present, other and more important symptoms may be missed, and also with the first symptoms differences are to be found. I find a support for this opinion in an unpublished piece of work of Fraenkel, a pupil of Kraus. He demonstrated that in spite of a certain resemblance, the figures of alkalinity obtained either by titrimetric methods or by measuring the carbonic acid in uræmia and infectious diseases were by no means identical with those obtained in the diabetic coma.

Having thus discussed the clinical aspect of acidosis I turn towards the chemical problem.

The inquiries upon the chemical connections of the acetone bodies, performed during the last decade, have broadened our knowledge, not only regarding the special pathogenesis of diabetic acidosis, but even concerning the general problems of metabolism.

It has been well known for years that acetone and the allied acids do not originate from carbohydrates. In the old controversy, however, the first reliable proof as to whether protein or fat was the mother-substance of the acetone bodies, was given only then, when it became evident that in a single experiment the amount of metabolized protein did not suffice for the formation of oxybutyric acid. I found in a boy suffering from diabetic coma, during three days a sum total of 342 grams of acetone bodies in the urine, but during this space of time only 270 grams of albumen were decomposed, in other words a far smaller amount. From the protein large quantities of sugar had been formed; it was, therefore, obvious that the protein alone could not have furnished such immense quantities of organic acids in the same time. In this example at least a great part of the acetone bodies must have been derived from the fat. However, this fact did not contradict a simultaneous formation from protein. Further experiments, carried out by Schwarz, Embden and Baer, proved, indeed, that acetone bodies may originate from both protein and fat.

---

[*] Having just returned from America I observed it for a second time in a uræmic patient, but this time on closer observation, its character struck me as being different from the dyspneic coma in diabetes.

All the researches of these authors are based upon the principle of feeding—in the presence of acidosis—a certain substance and of observing its influence upon the output of acetone bodies. Previous experiments had given no clear results, because the unbroken molecule of protein or fat had been given. Schwarz on feeding butyric acid was the first to examine the influence of *intermediary* products of fat. Later on amino-acids, the components of the protein molecule, and different fatty acids which could be assumed to be intermediary products of the katabolism of fat were administered in such experiments. Such investigations were necessarily carried out, as I said before, when acidosis of a certain degree was present, that is upon diabetic patients or dogs, or upon healthy animals and men fed exclusively on animal food. However, as spontaneous variations occur frequently in acidosis, the results of such feeding experiments are somewhat doubtful. A discovery of Embden, therefore, was of great advantage in the study. Embden, as you know, found that the isolated dog's liver on artificial circulation produced diacetic acid, which was no doubt derived from the oxybutyric acid. The amount of acetone bodies transferred from the liver to the blood increased considerably when certain substances were added to the blood. This method of investigation, employed with great skilfulness by Embden, has proved its value by giving striking results. Both methods of inquiry, that on the liver and that on living diabetic subjects, supplement and control each other exceedingly well.

We learn from them the following facts: The immediate predecessor of oxybutyric acid is *butyric* acid, which, by oxidation in β position, is converted into its oxy-acid. Butyric acid has shown itself to be the strongest producer of acetone bodies. The reason is to be found in the fact that this conversion needs only a simple and slight chemical reaction, the addition of one atom of oxygen. The higher fatty acids, however, have to undergo far greater decomposition, a splitting off of many atoms of carbon, before they reach the stage of a chain with 4 C atoms. In feeding fatty acids, with from 4 to 10 atoms of C, it became manifest that capronic, caprinic and caprylic acids, all having an even number of carbon atoms yielded oxybutyric acid, while other acids with an uneven number of carbon atoms, such as propionic and valerianic acids, did not yield oxybutyric acid.

Inasmuch as true fatty acids with an uneven number of carbon atoms occur but rarely in the animal metabolism, or only in small quantities, the practical value of this demonstration is of no importance in the metabolic changes in diabetes. For biological chemistry, however, this discovery was of great moment. From it, in connection with other experiments, we have been enabled to conclude that the katabolism of fatty acids goes on by the loss of two carbon atoms from the original chain. The splitting off begins with an oxidation at the β carbon atom. Thus a β oxy- and further on a β keto-fatty acid is formed; finally the β C atom is found to be at the end of a new fatty acid in the shape of a carboxyl group. In this way from stearic acid very likely is formed palmitic acid, and from this an acid with 14, 12, 10 and 8 C atoms is derived, and then capronic and butyric acid.

In the same way as acid decomposition goes on by the loss of a chain of two carbon atoms, so the building up of fatty acids by synthesis seems to be accomplished by a gradual apposition of two combined carbon atoms. The formation of fat, or rather of fatty acids from sugar, which in the animal kingdom goes on in large proportions, has been explained in this way by Nencki, Hoppe-Seyler and myself, and Heath and others have found new supports for this theory.

The relations existing between amino-acids and acetone bodies are not so clearly known as with the fatty acids because the chemical processes are more complicated. Some of the amino-acids, leucine, tyrosine and phenylamine, seem to be katabolized to oxybutyric acid, while others, alanine, valine and glycocoll apparently are not, but appear, on the contrary, to diminish the output of acetone bodies. In studying these substances very interesting results have been obtained regarding the oxidative decomposition of the amino-acids which up to this time has been completely unknown.

However, I will forego a discussion of the purely chemical aspect of this question. For the present it is sufficient to state the principal result of these investigations, which is a well-marked antagonism between two groups of amino-acids. Protein is by no means to be considered as a unit, in so far as acidosis is concerned, because some of its components may *increase*, and others *decrease* acidosis. So, too, in the formation of sugar the two groups behave differently. It should be remarked that those amino-acids, which in the present state of our knowledge are convertible into sugar, do not yield oxybutyric acid, while on the other hand that group of amino-acids which undergo transformation into acetone bodies does not give any sugar. Since the protein molecule contains groups of different behavior regarding acidosis, it is clear why it failed to show obvious results in those experiments, in which the whole unsplit protein molecule was given.

Ten years ago I mentioned another possible way for the formation of oxybutyric acid. I thought that it might be formed in a synthetical way. This might take place by union or two chains with two C atoms, but this way of formation has not yet been proven. Under this conception alcohol could furnish the material for the synthesis, but not only does it *not* increase the amount of acetone bodies in urine, but, on the contrary, it rather seems to diminish them.

Allow me to cast a retrospective glance at a period in which therapeutists have drawn erroneous conclusions from the results of these inquiries. When at the end of the last century ɔnly the fat, but not yet the protein, had been recognized as a source of acetone bodies, some physicians thought it necessary, to restrict the amount of fat taken by the diabetic, because they feared to raise the acidosis by giving fat. There are two rrors in this deduction. The first is the wrong supposition, hat increased *ingestion* of fat means increased *decomposition* f fat. But any one, possessing an elementary knowledge of he metabolism of matter and energy, knows that this is not the ase. A surplus of fat given in the diet does not raise oxidaion any more than does a higher amount of oxygen in the espired air. There is no danger that by *giving* more fat more t will be decomposed, and more acetone bodies set free n the body. And even if this were true, a second factor as neglected, the factor of the destruction of the formed ybutyric acid. Acidosis, and I repeat it again and again, es not only, or perhaps not at all, depend upon the *forma-* *n* of acids, but also and perhaps exclusively upon their comstion. Indeed after analyzing and taking into account the sults of all experiments carried out in this direction, I may , that the ingestion of fat in almost no case of diabetes has luced a marked increase in the output of acetone. An exption is given alone by butter, on account of its richness in ceryls of butyric acid.

n opposition to the behavior of fat a higher intake of pro- n may sometimes increase acidosis. But this does not hap- in a direct way, due to the formation of oxybutyric acid n protein, but in an indirect way. The demand made n the katabolizing and oxidizing powers of the organism arge quantities of protein ingested, may lessen the oxida- powers which concern the combustion of acetone bodies. h disturbances may arise also from other incidents such as bles of the digestive tracts. Since fat does not *directly* ease acidosis, we should always try, not only to maintain veight of the diabetic patient by a sufficient supply of fat ne diet, but even to increase the same.

ne endeavor to avoid those food stuffs, which may *form* utyric acid, is in vain, since protein and fat each do so. hol and sugar—and the latter is not available by the tic patient—are the only material which do not yield ne bodies. We ought rather to look for some substance n would diminish acidosis by increasing the splitting up he combustion of the acetone bodies.

merous substances are known which do this, and they cluded under the name of anti-ketonuric substances. The ıydrates exert the strongest anti-ketonuric effect. From 80 grams of sugar are sufficient in a healthy man to dissipate a strong acidosis, induced by a starvation or by exclusive animal food. As yet we do not know how this effect is accomplished. Naunyn's explanation that the decomposition of the acetone bodies is due to the simultaneous combustion of carbohydrates by secondary oxidation is merely a paraphrase. We are, therefore, compelled to look upon the occurrence as a fact without explaining it. A like efficiency is due to the preformed carbohydrates of the food, and to those which are newly formed within the body from protein or other material. *Glycerine* owes its anti-ketonuric efficiency to its being transformed into sugar. In healthy men the decomposition of large quantities of albumen can dissipate acidosis. Its efficiency likewise is to be referred to the partial conversion into sugar. For those very amino-acids—alanine, glycocoll and aspartic acid, which in the experiment of Embden and Baer showed an anti-ketonuric effect—are the ones from which sugar is formed. However, glycerine and albumen, which in healthy persons diminish the quantity of acetone bodies, are as good as useless in severe diabetes.

This fact, which previously appeared surprising, is now understood. The sugar, formed from glycerine and from protein, whose combustion induced the combustion of acetone bodies in *healthy* persons, is eliminated in severe diabetes and thus cannot be utilized for the oxidation of the acetone bodies.

Most other materials, known to be anti-ketonuric, such as gluconic acid and others, are not food stuffs and, therefore, cannot be employed permanently. Alcohol, though in bad repute as a poisonous substance, is the only food stuff, which acts beneficially on the diabetic acidosis. It has been shown by experiments of Neubauer and of Benedict that it decreases materially the amount of acetone bodies in the urine. In coma I would not only consider the ingestion of alcohol to be allowed, but even to be desired. Therapeutic experiments with this substance in coma require great discretion because of the effect upon the patient and judgment in the interpretation of this effect. Besides alcohol no other compound of the food is at our disposal for combating acidosis. The difficulties of the struggle against acidosis depend upon the fact that the energy of sugar, the most powerful anti-ketonuric body, is not available in severe diabetes. Every improvement in the toleration for carbohydrates will be followed by a decrease in acidosis; but the general treatment of diabetes is outside of the limits of my lecture. You may attain your purpose of increasing sugar combustion and at the same time lessening acidosis by different means: you may restrict the quantity of protein in the food, you may prescribe fasting and vegetable days, you may give an oatmeal diet for two or three days, you may prescribe muscular exercise, or you may combine all these measures, and this will depend on the peculiarities of each individual case.

The use of bicarbonate of soda, which we continually employ in the treatment of severe acidosis, does not act directly against it; neither does it diminish the formation of acetone bodies, nor does it favor their combustion. In many cases, on the contrary, the amount of acetone bodies found in the urine will increase, if great quantities of alkali are given. That by no means signifies a weakness of the oxidative powers, nor must it be considered as disadvantageous, or even dangerous. Rather the contrary is the case. While in general the amount of organic acids in the urine may be considered as an indicator of the degree of acidosis, this is different when alkalies are administered. Alkalies facilitate the elimination of acids by neutralizing them and thus withdraw the acids from oxidation; thus the amount of acids present in the body in a certain moment is diminished, and sufficient alkali is present always to neutralize them and to prevent poisonous action upon the cells. Naunyn contends that he has never seen a sudden death by coma following the withdrawal of carbohydrates since the time when he began to give sufficient quantities of alkalies from the beginning of a strict diet. But no matter how beneficial is the action of alkalies, we should not forget that they act only as a palliative remedy and that we should seek for more efficacious substances with which to combat directly the acidosis.

If that substance is once found, which will enable the diabetic to utilize carbohydrates, acidosis and its dangers will have disappeared.

I return to the problem which I touched slightly at the beginning of my lecture. I have mentioned the possibility that acidosis might have nothing to do with an increased formation of oxybutyric acid, but that it depended exclusively on disturbances of oxidation. One may imagine that also in normal life oxybutyric acid may be formed *to the same extent* as in the coma. This doctrine presupposes that each molecule of fatty acid and of amino-acid, which, according to our knowledge *may* be transformed into acetone bodies *must* really be so without exception. In other words, that this way of decomposition of fats and certain amino-acids, leading to oxybutyric acid, is not a facultative one, but that it is *obligatory*. I was able to prove that in diabetic coma such a maximum of oxybutyric acid was formed. One of my patients had decomposed 90 grams of protein and almost 200 grams of fat within 24 hours. From these substances, as far as calculation is possible to-day, about 110 grams of acetone bodies could be derived. This quantity really was found to be eliminated by the urine during three subsequent days. A healthy man living on a carbohydrate free diet would consume about 120 grams of albumen and 210 grams of fat daily; from these about 120 grams of oxybutyric acid could be formed; that means about 1½ to 2 grams per kilo. Are we allowed to assume that he really forms such quantities of acids? We are allowed to do so if we can make it probable, that he is able to destroy them by combustion. Rabbits and dogs have oxidized 3 grams of this acid and even more per kilo introduced at one time into their stomachs. Since combustion is far easier when such substances are formed within the body, it might be possible for a healthy man to decompose 2 grams per kilo.

I furthermore call attention to the great amount of acetone bodies, which may be formed by non-diabetic organs. In Embden's experiments, the isolated dog's liver, an organ of scarcely 200 grams in weight, yielded 3, 4 and even 9 grams of diacetic acid, calculated for 24 hours. Since a part of it certainly had been destroyed, in the course of the experiment the production was in reality much larger.

No reasons exist in my opinion to disprove the conception that a healthy man may form and oxidize such large quantities of acetone bodies. For a long time these substances have been recognized as products of intermediary metabolism. According to my doctrine they would not be *facultative*, but they would be the *obligatory* products of the decomposition of fatty acids and of some amino-acids. If this doctrine is right, you see clearly that acidosis is *only* the consequence of disturbed oxidation. However, this conception is as yet not absolutely proven.

Embden takes the opposite standpoint. He observed that the surviving dog's liver, which was found to *produce* acetone bodies, was able also to *katabolize* diacetic acid. In continuing his researches on the liver of a depancreatized dog, he found that the destruction of diacetic acid was not smaller than with the liver of a healthy animal. Thus finding no decrease of oxidation, he considered acidosis to be caused by increased formation of acids. However, it is not allowable to transfer the results of the experiment upon a dog to the metabolism of man. Both behave differently. In living dogs accumulation of acids does not occur so generally and to the same intensity as in man, they do not lose the capacity for combustion of acetone bodies so completely as diabetic patients. There is a very marked difference between carnivorous and omnivorous animals. Men, using carbohydrates as food, destroy the oxybutyric acid, formed from fat and from albumen, *only* by the help of carbohydrates; they lose this capacity more or less if they become unable to katabolize the sugar molecule. Carnivorous animals, on the contrary, living on meat and fat, are enabled by nature to burn oxybutyric acid *without* the help of ingested carbohydrates. That means a wise arrangement of nature—and thus in diabetes of dogs accumulation of acids never reaches such an extent as in men.

You might ask me why accumulation of acids is increased so suddenly in diabetic coma. One may ascribe this sudden increase, at least in some cases, to a sudden decrease or even to a loss of the sugar combustion. Spitzer reports a case where this was obvious. Coma set in immediately after a strong physical shock combined with a psychical emotion. From that moment the elimination of sugar, up to then rather slight, rose to an abnormal height, and at the same time with increased loss of sugar the oxidation of acetone bodies was reduced to a minimum. Here no time was left for adaptation, which in the general course of diabetes prevents the rapid increase of acidosis. I might quote other examples where such a sudden increase of the toleration for sugar can be observed: I mean those very rare cases of acute diabetes, the beginning of which may sometimes be determined almost up to the hour by the sudden appearance of a terrible thirst in patients who until then showed not the slightest symptoms of diabetes. In such cases acidosis also arises suddenly and advances rapidly. The time being far advanced I confine myself to these few remarks.

ill not be quite easy to clear up all problems of this ter.

am at the end of my lecture. I have not considered it my ct to dwell upon those symptoms of acidosis which are idered more or less absolute facts. This was unnecessary an audience so well informed on the subject as an au- ce of American physicians. I have undertaken the more valuable task to show, which problems are awaiting yet their answer and what objections may be raised to the doctrine of acidosis. To many of our profession the theme of acidosis seems to furnish no problems for future research. I hope to have demonstrated in which direction further research may be successful in order to advance both the theory of acidosis as well as its treatment.

SOME OBSERVATIONS ON THE BACTERIOLOGY OF THE BALTIMORE CITY WATER.*

By William W. Ford, M. D.,

Associate Professor of Hygiene and Bacteriology, Johns Hopkins University.

he importance of a thorough knowledge of the water used he city of Baltimore cannot be overestimated, especially e present time when heavy expenditures are to be under- n for the enlargement and permanent improvement of the ly. It is essential that the character of the water collected e various water sheds which feed the city reservoirs should ell understood, particularly its content in bacteria, and xtent to which it is polluted by microörganisms derived the intestinal tract. The results of such a study belong tially to the medical public of the city, and if these results ate a pollution of the supply which is at all likely to be a ace to the public health, it is the duty of every one con- nt with the bacteriology of the city water to make his ledge common knowledge. The number and character of microörganisms found in the water delivered to the con- r will determine in a great measure the necessity of ing it through sand filters, unless a careful examination e various tributaries of the main streams utilized by the hould reveal that the pollution which may be found has urce in a few small streams which can be eliminated from stem.

ring the past six years I have been making regular iological examinations of the water drawn from the tap Bacteriological Laboratory, and in the organization of a n Practical Hygiene have had the opportunity of paying nt visits to the valley of the Gunpowder River and of ng several of its most important branches in Baltimore y, particularly the Beaver Dam Run, the Western Run, e Oregon Branch. For a number of miles in the vicinity e streams the general conditions prevalent along their have been carefully scrutinized, especially any local ons which might favor a sewage contamination. The from our tap has its source primarily in the Gun- River, and it has thus been possible to compare the ological findings of the water as delivered with those of samples collected from the river itself and from the entioned tributaries. Recently it has seemed wise to the work of this fairly long period of time and the found during the different years agree so completely as to make deductions from the evidence presented of considerable value. The main conclusions obtained do not differ to any appreciable extent from those reached by Dr. W. R. Stokes and his co-workers in the Bacteriological Laboratory of the City Board of Health, but in a question so vital to the well-being of a community as its water supply, it is of paramount importance that the work done in different laboratories should be carefully compared. Only in this way can observations of permanent utility be made.

Tap Water.

The water supplied to the Bacteriological Laboratory is derived from Guilford Lake and thus from the Gunpowder River at Lock Raven. This water has been examined at frequent intervals by the simplest methods in vogue for the study of water bacteria. The colonies have been counted on agar and gelatin plates, with 1 cc., 1/10 cc. and 1/100 cc. quantities. The average of these three counts has been taken to represent the bacterial content of the samples. Fermentation tubes of 1 per cent dextrose broth have been planted with 1 cc. and 1/10 cc. quantities and rarely with 1/100 cc. When these tubes showed positive fermentation by the production of acid and the evolution of gas, plates have been poured from the open bulb, the various colonies fished and planted on agar, and subcultures made in agar, gelatin, potato, Dunham's solution, litmus milk and various sugars. These reactions together with the morphology and motility of the organisms have served to establish the identification of the various species.

The number of organisms per cubic centimeter in our tap water is not large. It is uniformly below the standard of purity, 1000 to the cubic centimeter, and is usually between 500 and 600. It may be as low as 300 to the cubic centimeter. On rare occasions it may be increased to 1500 or even 2000. A high bacterial count is not common and is usually associated with heavy rains in the vicinity of Baltimore and is accompanied by a great increase in turbidity. From the bacterial count alone there is little or no evidence of pollution. Fermentation tubes, however, show almost invariably a positive presumptive test for *Bacillus coli*. This is practically always

---

before the Baltimore City Medical Society, May, 1910.

given in 1 cc. quantities and it has proved a rare event, during six years of routine examinations, for this test to fail. Occasionally when a single Smith tube is planted with such a quantity, there is no active fermentation of the sugar as a result, but if half a dozen tubes be planted at the same time the majority always shows a positive presumptive test. Not infrequently the tubes planted with 1/10 cc. also give positive results and on very rare occasions I have seen acid and gas develop in the tubes planted with 1/100 cc. When plates are poured from the fermentation tubes and the various bacteria isolated which give rise to the splitting up of the sugar, considerable diversity is evident in the characteristics of the microörganisms encountered. The principal isolations, nevertheless, have certain cultural features which indicate that their source of origin lies in the intestinal contents. The species may be grouped about six main types.

Group I. Bacillus Coli Type.

In the majority of instances the microörganisms found in the fermentation tube conform to the classical type of *Bacillus coli*. They are small, sluggishly motile bacilli which produce a rather thick, moist, non-pigmented growth on agar, fail to liquefy gelatin, acidify and coagulate litmus milk without digestion of the casein, and ferment dextrose with acid production and the evolution of a gas composed of a mixture of hydrogen and carbon dioxide, with the formula $\frac{H}{CO_2} = \frac{3-4}{1}$. Many of the strains isolated produce indol abundantly, the reaction being brought out by the addition of nitrites to the mixture of sulphuric acid and a Dunham's solution culture, and in many instances the usual dirty brown growth on potato is also seen. Neither indol production nor abundant growth on potato have been considered essential in the identification of the organism, the previously mentioned reactions being regarded as diagnostic.

Group II. Bacillus Proteus Vulgaris Type.

Organisms of the "proteus vulgaris" type have been isolated on a number of occasions. In morphology they are not unlike *Bacillus coli*, but are somewhat longer and thinner. They have a rapid darting motility characteristic of this group. Their colonies on agar and gelatin have spreading, *leaf-like* edges and the lattter medium is rapidly liquefied. On the surface of slant agar the growth is spreading and in stab gelatin cultures liquefaction progresses rapidly in a transverse direction along the surface of the solid medium. The organisms ferment dextrose with a gas formula of $\frac{H}{CO_2} = \frac{3-4}{1}$, the hydrogen being in excess of the carbon dioxide. Milk is not firmly coagulated but shows a soft clot, the reaction remaining alkaline, and the litmus being completely reduced. The clot is slowly dissolved and the litmus milk is eventually converted into a glairy, dirty brown fluid in which no trace of curd is visible. If fresh litmus be added, the reaction is seen to be alkaline. Indol is seldom produced by these microörganisms. They belong clearly to the "proteus vulgaris" group.

Group III. Bacillus Cloacae Type.

Bacteria of the "cloaca" type have been encountered from time to time in the tap water. They have a morphology and motility like that of *Bacillus coli* and on the surface of agar they look not unlike this microörganism. They acidify and coagulate milk, and produce non-spreading colonies in agar and gelatin. The latter medium is liquefied and the precipitated casein in the milk tubes slowly digested. The organisms ferment dextrose actively, the gas produced showing an inverted formula, $\frac{H}{CO_2} = \frac{1}{3-4}$, the carbon dioxide being in excess of the hydrogen. They may or may not produce indol and in some instances their liquefaction of gelatin is extremely slow.

Group IV. Paratyphoid or Paracolon Type.

In a few samples we have isolated species which must be called "paratyphoid" or "paracolon" bacilli. They resemble *Bacillus coli* or *Bacillus typhosus* in morphology and motility, fail to liquefy gelatin, and ferment dextrose with the usual *Bacillus coli* gas formula, $\frac{H}{CO_2} = \frac{3-4}{1}$. In milk they produce a slight but transient acidity which gives place to an alkaline reaction after the lapse of four or five days. Their cultural characters place them clearly in the intermediate group.

Group V. Liquefying Organisms like Bacillus Coli.

Under this heading we have placed a number of cultures which represent a distinct type. The organisms have the greatest superficial resemblance to *Bacillus coli* in morphology, motility and growth on agar. In the dextrose fermentation tube they produce an acidity and evolve a gas which has the regular formula $\frac{H}{CO_2} = \frac{3-4}{1}$. On potato they grow in a dirty brown layer. They may or may not produce indol. While thus having many of the characters of *Bacillus coli* they are distinguished from it by their rapid liquefaction of gelatin. The liquefaction is funnel-shaped, proceeding out from the line of growth of the bacteria and not from above downward as in the "proteus" and "cloacae" cultures. The colonies have no tendency to spread and are thus distinguished from *Bacillus proteus vulgaris*, while by their gas formula they are differentiated from *Bacillus cloacae*. The species is a distinct one, and I have found it on a number of occasions in the city water.

Group VI. Bacillus Faecalis Alkaligenes Type.

Many of the fermentation tubes which show the presence of the various organisms above mentioned give in addition colonies which develop into a non-fermenting organism of great importance. This is Petruschky's *Bacillus faecalis alkaligenes*. It has a motility and growth on agar like that of *Bacillus typhosus*, fails to liquefy gelatin, produces an alkaline reaction in milk, and in the fermentation tube grows only in the open bulb with the production of alkali. This organism occurs frequently in the city water and may be isolated both from the fermentation tubes and from agar plates.

Significance.

While the microörganisms belonging to the above-men- ioned types are accompanied, in our city water, by the isual water bacteria, spore-bearers, pigmented forms, etc., he latter are in the minority. The species usually encoun- ered are the non-pigmented, non-spore-bearing, sugar-split- ing bacteria, and it is important to consider what significance nust be attached to their isolation. It seems to me that but ne opinion can be expressed as to these findings. They ndicate a permanent and serious pollution of the supply. 'he presence of *Bacillus coli* regularly in one cubic centimeter uantities is recognized by all sanitarians as evidence of sewage ontamination and its occasional isolation from smaller quan- ities, 1/10 cc., is evidence that this contamination is ex- ensive in character. The presence of these other strains ; also, I believe, not without considerable signficance. In ome instances, as with *Bacillus cloacae,* we are dealing with ı organism which is characteristically found in sewage from hich source it was first isolated by its discoverer, Jordan (1). ı other cases we have organisms of the "proteus" type, hich may and probably do exist in nature, but many years o I (2) pointed out that this species is, next to *Bacillus coli,* e most commonly found species in the intestinal tract of ın, and it is not impossible that its presence in the city ter is due to fæcal pollution. Other organisms which have en isolated, those of the "paratyphoid" and "alkaligenes" e, are essentially intestinal in character. This is especially c of Petruschky's bacillus which is present in the ali- ntary canal in nearly every individual. Finally the organ- s mentioned above as "liquefying organisms," like *Bacillus* have long been viewed with suspicion by bacteriologists. y are probably identical with the organisms described in literature as "liquefying coli" a misnomer which Durham especially has deplored. I have isolated them frequently in Baltimore from sewage, from some of the tributaries he city water, as well as from the tap water itself, and ı polluted deep water wells. They are identical in cultural acters with a liquefying bacillus which I described from intestines several years ago and the late Major James oll, of Washington, stated that these organisms were very non in various samples of water examined by him in ington and believed to be contaminated. While their ficance as an index of pollution is by no means certain, escott and Winslow (4) point out in regard to intestinal ria which are not *Bacillus coli* yet their constant isola- from the city water, which is definitely polluted by *lus coli,* is not without considerable interest.

Source of Pollution.

thus see that the water drawn from the tap shows the ıce of serious pollution and since these results have obtained now for a period of six years this pollution tly has a permanent character. If we now ask its source ifficult, if not impossible, to point to any one particular which is responsible for the contamination. My own ations relate only to the district in the immediate vicinity of the small town of Cockeysville and are concerned with three especial tributaries which empty into the Gunpowder River in this locality. These small streams are Beaver Dam Run which passes through Cockeysville, the Oregon Branch, and the Western Run. The water of these three runs is grossly polluted. This can be made out simply by an inspection of their banks where the sewage of numerous farm houses and of one or two small settlements can be seen making its way directly into the streams. As these small runs join the Gunpowder not very far above the dam at Warren the origin of the contamination of the Gunpowder water is not far to seek. The evidences of pollution which may be gained by naked eye inspection are amply substantiated by the bacteriological examination of the water collected from the various runs and of samples drawn from the Gunpowder itself. The number of organisms in the river and in the tributaries is fairly high, varying from 2,000 to 25,000 per cubic centimeter, and the fermentation tube reveals a very serious pollution. The presumptive test is frequently positive in great dilution, 1/100 or even 1/1000. The species cultivated from the agar plates and from the Smith tubes conform to the types isolated from the tap water. *Bacillus coli* is most frequent, but *Bacillus cloacae,* the liquefying organism like *Bacillus coli,* and *Bacillus faecalis alkaligines* are also found with some constancy. Some of these small streams indeed seem to carry nothing but a diluted sewage. The sedimentation in Lock Raven and in the various city reservoirs has served only to diminish the number of microörganisms. It has not altered the essential character of the bacteria, the species which survive and appear at the tap being practically identical in character with those found in the Gunpowder water above the Warren Dam before any considerable sedimentation has taken place.

Remedy.

If our ideas as to the pollution of the Gunpowder River shall be substantiated by the work of other investigators, or if other sources of fæcal contamination shall be found, as for instance in Lake Roland and its tributaries, with the study of which Dr. W. R. Stokes has been engaged for some time, then the question naturally arises as to the means which must be adopted to remedy this evil and protect the citizens of Baltimore from the risk of water-borne infections. In my opinion the pollution of the Gunpowder River is too great and the sources of contamination too manifold to permit the adoption of hygienic measures which would be stringent enough to alter the character of the water permanently and make it safe for drinking purposes. Since the Gunpowder River offers the city the most convenient and most valuable source of supply, or at least may be used as the chief portion of our system, this water must in some way be made suitable for domestic use. There is evidently but one method of bringing this about. The water must be filtered, preferably through sand filters. Fortunately, this measure has already been adopted by the city, and it is a matter of supererogation at the present time to call attention to its necessity. Our bacteriological examinations serve then more to testify to the wisdom of these patriotic officials, who for some time now have insisted upon the installation of some system of sand filtration for the purification of our water supply, than to call attention to some measure which it is impossible to carry out.

Even if it be claimed that filtration will not necessarily diminish our mortality from typhoid fever, the chief water-borne disease, we must remember that there is abundant evidence to show that the adoption of filtration plants has been followed by a diminution of the mortality from enteric fever in many cities. That this is not always the case seems to be true from the experience of the city of Washington. It may be pointed out, that this latter city forms an exception to the general rule, and that the typhoid fever was evidently not associated with a polluted water supply, but was due apparently to bad hygienic conditions in regard to the milk and food furnished the city. We believe, however, that our water supply is contaminated, and that it should be purified on general principles of good sanitation. If it diminishes the typhoid mortality, then we shall indeed be fortunate. But we do not know the source of *all* of our typhoid fever. Some may be water-borne and personally I am inclined to believe that much of it is associated with our polluted supply. But some may be milk-borne and some may be the result of a direct transmission of the typhoid bacillus from one individual to another. Any one who has examined, over any length of time, the milk sold in the little shops in the poorer sections of the city, where the bacterial count may reach 3 to million to the cubic centimeter, must realize that the conditions which allow this great bacterial pollution will also allow a pollution of the milk by *Bacillus typhosus*. And any one who has read that valuable little contribution of Baetjer (5) on an epidemic of tyhoid fever in Baltimore County, where 17 cases of typhoid occurred in two houses, must feel that part of this disease in our midst is due to direct infection or to chronic bacillus carriers. Let us first provide Baltimore City with pure wholesome water and eliminate our polluted supply as a possible source of typhoid fever. We shall then be in a position to devote all of our energies to further study of this malady, ascertain more accurately the origin of the disease and adopt those preventive measures which modern hygiene is teaching us are effective in controlling the spread of this most serious infection.

BIBLIOGRAPHY.

1. Jordan: Special Report of the State Board of Health of Massachusetts on the Purification of Sewage and Water, 1890, II,
2. Ford: Studies from the Royal Victoria Hospital, Vol. I, No. 1, May, 1903.
3. Durham: J. Exp. Med., Vol. V, p. 353.
4. Prescott and Winslow: Elements of Water Bacteriology, 1904.
5. Baetjer: Johns Hopkins Hosp. Bull., Vol. XX, No. 218, May, 1909, p. 152.

A CASE OF CONGENITAL DEFORMITIES (PATENT DUCTUS BOTALLI; ABSENCE OF LEFT KIDNEY AND CHRONIC PERIPHERAL ŒDEMA).

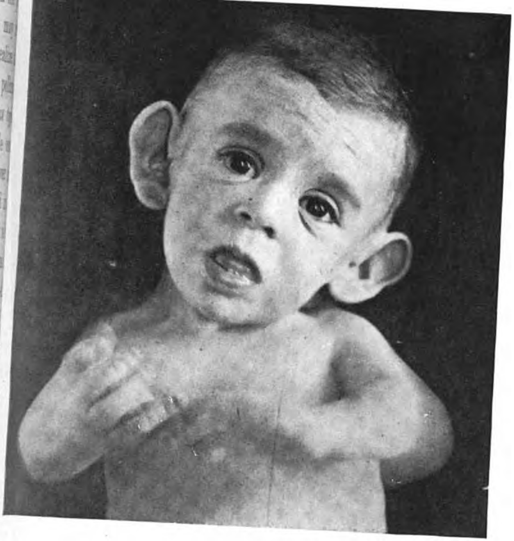
By Charles R. Kingsley, M. D.,
Medical House Officer, Johns Hopkins Hospital.

(From the Medical Clinic of the Johns Hopkins Hospital and University.)

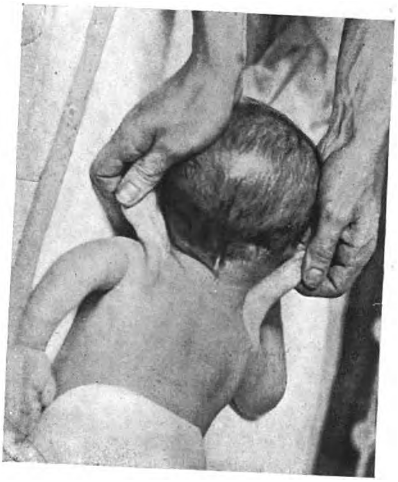
Jennie L., a white child, five months old, of Russian parentage, was admitted to the medical side of the Johns Hopkins Hospital, August 31, 1909. According to the mother, both parents had been well, with no history of tuberculosis or alcoholism on either side. The patient was the last of a family of eight children, all normal and healthy. There had been no miscarriages. The patient was born after a nine-months' pregnancy, during which the mother did her usual housework, but suffered no trauma. The presentation was breach, but the labor was easy. Soon after birth the mother noticed that the child's hands and feet were swollen and the tongue was too large for the mouth. No attention was paid to this since the child nursed well and grew, but the continuation of the deformities decided the mother to take the child to the hospital.

On admission to the ward the patient was found to be of average size for her age, 56 cm. long, and fairly well nourished, weighing 5675 gm. She appeared normally bright and intelligent, noticing people, surrounding objects, and moving about actively. The skin was soft and smooth, with no eruption anywhere. The head was held up fairly well and seemed normally formed, with a small anterior, and an almost entirely closed posterior, fontanelle. There was no brachycephaly with shortening of the anterio-posterior diameter and flattening of the occiput, the measurements being about normal for a child five months of age. A growth of fine black hair covered the head; the eyebrows and lashes were long. There was a peculiar bluish pallor of the face, but no cyanosis of the lips and finger tips. The neck presented an odd appearance due to two folds of redundant skin which ran from behind the ears to the shoulders, extending about 8 cm. in breadth when stretched. A slight prominence of the eyes was noticeable; ocular movements were normal with no strabismus or nystagmus. There was no epicanthus and the face was not that described as typical of a mongol. The pupils were equal, reacting normally; scleræ clear and conjunctivæ of good color. Large, thin, flabby ears protruded at right angles to the head. Hearing was absent on the left side, and a purulent

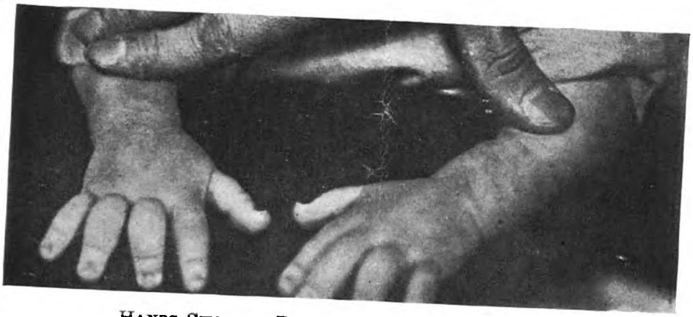
PLATE V.



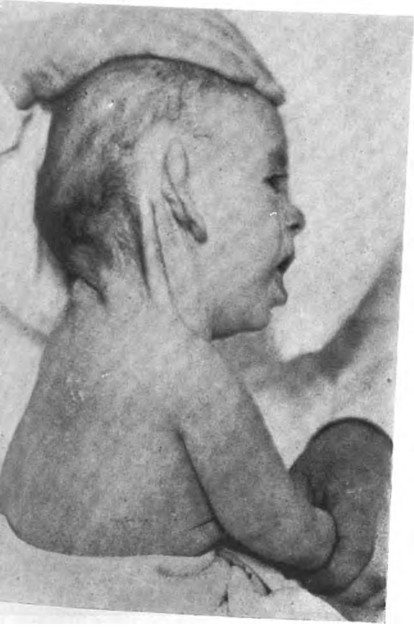
FACE: NOTE LARGE TONGUE AND EARS.



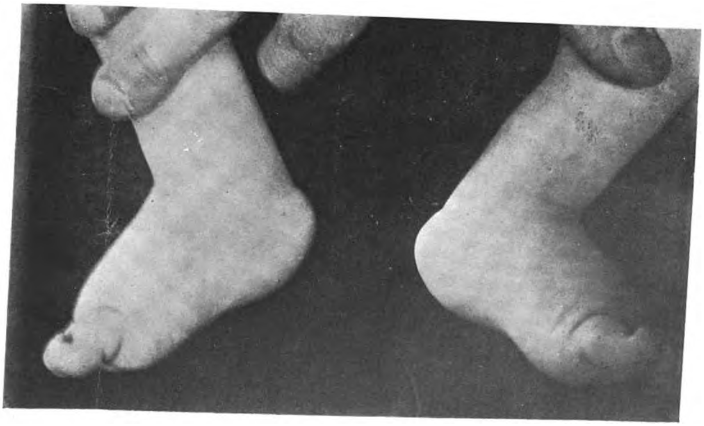
CUTANEOUS FOLDS—FROM BEHIND.



HANDS SHOWING PECULIAR FINGERS AND OEDEMA.



CUTANEOUS FOLD—SIDE VIEW.



FEET: NOTE PUFFY OEDEMA.

scharge was found in the left external meatus. Breathing was unobstructed and the nose normal looking. A huge tongue protruded through the lips to a level with the surrounding skin. There was no furrowing or enlargement of the papillæ, but the tongue was coated and indented by the upper and lower alveolar ridges. The saliva was swallowed. There was a highly vaulted palate and a large uvula but no abnormality of the tonsils and pharynx. The lips were not especially thick or protruding and there were no rhagades. No glandular enlargement was found. The thyroid could not be felt and there was no substernal dulness to suggest a thymus gland. The thorax was well formed, free from rickety rosary and Harrison's grooves. In the notch of the epigastrium the cardiac impulse was most forcible and on percussion the heart's dulness was normal in location and size. On auscultation there was an embryocardia and a sawing systolic murmur, following the first sound, well heard over the left chest. At the base the systolic murmur was especially loud and vibrating with a point of maximum intensity over the upper third of the sternum; both second sounds were clear. The pulse was regular, of good quality, and well felt in the extremities. The abdomen looked natural, without marked prominence or hernia. A soft liver edge could be felt about 2 cm. below the costal margin. The spleen was not palpable. The genitalia were normal in all respects.

The extremities were bulbous, showing considerable swelling of the lower parts of the legs and forearms. The skin looked waxy and bluish over the dorsa of the hands and feet, pitting readily on pressure, but not thickened or indurated. The extremities were cold. The fingers and toes were long, showing a fusiform enlargement of the two proximal phalanges which were in slight flexion, the distal phalanx being in slight extension. A transverse line of constriction formed a groove at the terminal phalangeal joints, most marked in the fingers, but present in the toes to a lesser degree. Both finger and toe nails were growing almost at right angles to the digits, apparently pushed up by an overgrowth of the terminal phalangeal tissue. The muscular power and sensations seemed normal.

Examination of the blood showed a red cell count of 4,-00,000, white cells 10,000, and hæmoglobin 78 per cent. The urine and fæces were normal. A Wassermann test, done on the blood serum, gave a negative result. X-ray plates of the hands showed no abnormality.

The child was kept on graded doses of thyroid extract in the belief that the condition might be an atypical form of cretinism, but after two months, there being no improvement, the drug was discontinued. Small doses of diuretic drugs combined with digitalis failed to affect the œdema. The tongue remained as on admission, large and protruding. The greatest difficulty was encountered in finding a modified milk suitable to the child's delicate digestive organs. There were several gastrointestinal upsets with vomiting, diarrhœa and a temperature of 101° F. The weight remained about as on admission with occasional fluctuations. The temperature, aside from the gastric upsets, was normal or slightly below; the pulse rate was normal. In January the child seemed weak and feeble, and on the 9th of the month her temperature rose suddenly, with a profuse diarrhœa and vomiting. There was no improvement in the condition and exitus occurred next day.

Autopsy (Dr. Whipple).—The interesting points in the autopsy findings are as follows: a very inconspicuous thymus, there being practically no tissue where the gland should be. Normal heart valves, but an open ductus Botalli, measuring about one millimeter in diameter. An acute diffuse cellular myocarditis. No special hypertrophy of the ventricles. Scattered areas of broncho-pneumonia in both lungs. The left ureter appeared normal at its entrance into the bladder and as far as followed up to the brim of the pelvis. Here it was lost and no remnant of kidney tissue was found in this area. The left adrenal was close to the diaphragm and appeared normal. The right kidney was very large, about the size of two normal kidneys. There was a single distorted pelvis coming from the anterior median portion of the irregular kidney mass, the long axis being nearly parallel with that of the vertebral column and lying almost completely to the right of the vena cava, which crossed over its mesial surface. The kidney substance looked in no way abnormal. An acute enteritis throughout the ileum was found.

The thyroid was small, pale, and uniform on section. The bone marrow appeared normal. Unfortunately, no permission to examine the brain could be obtained.

RANSVERSE FRACTURE OF THE BODY OF THE ISCHIUM IN 1893; TERMINAL DISPLACEMENT IN 1902; DIAGNOSTICATED IN 1909.

By Norvelle Wallace Sharpe, M. D.,
St. Louis, Mo., U. S. A.

The case herewith detailed is not classified as unique, but extreme rarity and interest.

Fractures of the ischium, participating in a general pelvic sh, are not notably rare.

Fractures of the ischium, without coincident pelvic fractures complications are considerably more infrequent, and are thy of record.

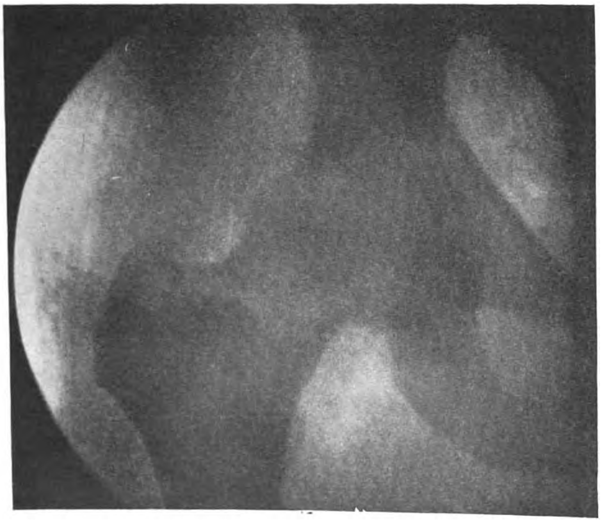
Fractures of the *body* of the ischium, the result of direct impact, and without coincident pelvic fractures or complications, producing but moderate disability and remaining undiscovered for an extended period of time, are not only noteworthy on account of interest and rarity, but specially merit consideration in conditions which involve a differential diagnosis.

The following dicta from *Scudder, Keen,* and *Stimson* are recorded as suggestive:

Scudder, "Treatment of Fractures," 1910; "fractures of sacrum, coccyx, symphysis pubis and ischium are extremely rare."

Keen, "Keen's Surgery," Vol. II, 1907; "fractures of the ischium, sacrum, and coccyx . . . . are very rare."

Stimson, "Fractures and Dislocations," 1907; "fracture of the ischium is one of the rarest of fractures of the pelvis. *Malgaigne* collected only six cases and his list has not been since increased by any reported in detail. In some of the cases almost the entire ischium was broken off, in others only the tuberosity. Experiment indicates that a fracture may pass into the cotyloid cavity. In three of Malgaigne's cases the cause was a fall upon the buttocks; the fourth a gunshot fracture, the fifth caused by an explosion, the sixth due to forceps manipulation, in a case formerly with the pelvic ring fractured, and ischium was broken. In the simple cases there was little or no displacement; in the gunshot fracture the fragment was displaced downward more than 2 inches by contraction of ham-string muscles, the displacement persisted but does not appear to have interfered materially with the movements of the limb."



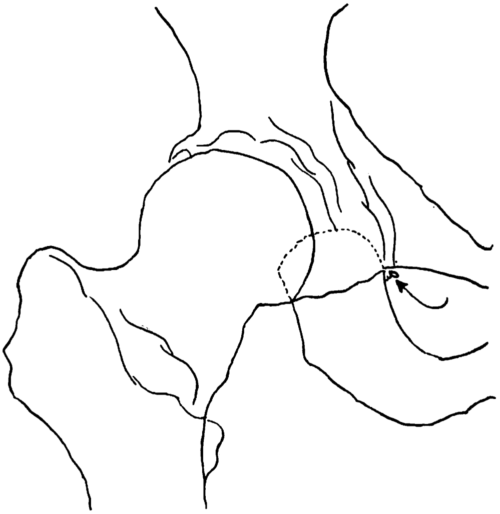
Transverse fracture of body of right ischium (about ¼ size of original plate). Note ¾″ overlap of the caudad fragment (*cf.* Section 2 of Dr. Carman's report).

H. D. B., aet. 64, has led an active mercantile life, relieved by field and water sports abundant in quantity and choice in character. The patient is vigorous and well muscled, 5 feet 5 inches in height, weight 165 pounds, he exhibits a substantial amount of adipose. For some years has "had trouble with right leg"; an attack of left "sciatica" in 1901, and more or less so-called "sciatic pains" on both sides since. Right hip and thigh became troublesome in 1903; "[illegible] keep up in my shooting"; "friends noted a slight drag," etc. Pains now began in hip, back, knee and foot, rarely at night, but more or less constant when walking; this pain and "consciousness of having a hip" have thus existed *seven years.* Patient has consulted numerous physicians both in the States and abroad, the various diagnoses leaning to some form of sciatic involvement. In 1909 an X-ray examination was made at a New York up-state sanitarium, and a diagnosis of "trochanter split and piece off of one side," rendered.

For the aforesaid "sciatica" relief has been sought through applications of electricity, liniments, Swedish movements, massage, "light treatment," leucodescent lamps, etc., but all without avail.

The trouble, not disabling, but ever present, remained without improvement, indeed it grew worse.

His condition was brought to my attention last November (1909); before any examination was made, he was referred to Carman (St. Louis) for a searching X-ray exploration. A diagnosis of fracture of right ischium was returned. At a later consultation (April 29, 1910), an effort was made to discover an anamnesic clue that would indicate when the fracture had occurred and how it had remained so successfully undiscovered.



Key to Plate.—Contrast sharp angulation at *a* (caused by cephalad displacement of caudad fragment) with normal graceful periphery of obturator foramen.

Patient's record shows that in 1897 he sustained a severe fall on a marble floor; a critical orientation of the facts coincident with and sequent to this accident leads to the conclusion that in no manner should it be considered the cause of the fracture. An antecedent accident proved more promising: in truth *the only casualty in the record that warrants serious consideration.* The details are:

In 1893, while fishing, patient sustained a severe fall striking his right buttock on "a pointed rock" (in shape, I take it, akin to a cypress knee, familiar to those who shoot

in the swamp and overflow lands of the South); there
nediately followed intense local pain (patient states that
" was almost paralyzed"), this remained for several hours,
by the following morning merely the ordinary sensations
a severe contusion were present. No essential disability
owed, and though moderate discomfort was more or less
stantly in evidence he continued an active life, including
shooting and fishing. For this discomfort, during the
eeding years, he was subjected to the various forms of
tment above noted.

n 1902 while indulging in some "physical culture" exer-
s (ordered for the existing trouble), during which the
t leg was extended and the thigh flexed sharply on the
omen, *"something snapped"* within the right pelvis.
s sensation was distinctly experienced by the patient, and
nd peradventure, his memory in this regard being quick-
l by the fact that he recalls having announced to a relative
as a result of this incident, he was "done with physical
ure" and allied forms of treatment.

n 1903 hip and thigh became more troublesome, he could
maintain his former speed and endurance in a day's shoot,
his disability became patent to his friends (as noted
e).

ost careful questioning fails either to shake the evidence
recorded or to introduce any other accident that might
reasonable probability be held to have definite etiologic
ificance.

he conclusion is therefore compelled that this ischium was
tured in 1893, and remained *undiscovered for sixteen*
s. i. e., up to November, 1909.

he interesting question arises, is it not possible, during
energetic movements of the "physical culture" episode
902, that the overriding of the caudad fragment (see
y photograph) was developed; and that antedating said
de (i. e., 1893-1902) the fragments had remained in fair
inal apposition, maintained either by a reasonably intact
steal bridge or an elastic fibrous bond, competent for all
ary demands, but which yielded to the sudden violence of
with consequent overriding. Furthermore, is it not
ble that this overlapping displacement, once established
02 has continued, without reduction, to the present day?
is remarkable that in a man, very intelligent, capable of
a lucid description of facts and symptoms, anxious to
ain himself in the pink of condition, comfortably well-
and under the observation of numerous physicians; it
eed remarkable that such a fracture should remain
vered for sixteen years. There are two possible expla-
: first, X-ray orientation had not been developed to its
accuracy in the earlier years of his disability, and as a
was neither frequently recommended nor often em-
second, the combination of a well-to-do patient, ex-
ly solicitous regarding his physical condition, present-
syndrome readily assignable to "sciatica" with no
ly exceptional or highly suggestive clue leading toward
ustive examination and a more exact diagnosis—this
tion probably proved the pit into which "all fell." It is stated that at no time during these many years was a rectal examination made.

Obviously: *Haec fabula docet rationem examinem sine cura culpam gravem esse.*

Present Condition.—Pain is moderate when seated or in bed, but constant when walking, it is accentuated during damp or unsettled weather. He uses a stick, and evidently "nurses" the right leg during locomotion, for excursion of the knee is automatically limited. States that he is liable to stumble over small obstacles; the resulting "jars" are painful, radiating down the thigh. Can definitely identify (and claims to have always been able to definitely identify) a relatively sensitive area, i. e., the tuberosity of the right ischium and peri-ischial structures. He continues to engage in a fairly active life but, handicapped as above, has eliminated the more vigorous forms of his customary sports.

Comparative measurements show relative dextral symptosis:

	Right.	Left.
Circumference calf	14″	14¼″
Circumference thigh lower ⅓...............	15¾″	17″
Circumference thigh middle ⅓..............	20⅛″	21¼″
Mid. symphysis to postmesial line...........	18″	21″
Ant. Sup. Spine Ilium to Internal Malleolus.	31½″	31¾″

The mid-symphysis postmesial measurement is particularly interesting in that it records dextral gluteal change.

Rectal examination reveals an area of the right ischium sensitive to pressure. This area exhibits a moderate entad boss, which accurately corresponds to the overlap of the caudad fragment of the ischium (see X-ray photograph).

Dr. Carman, to whom full credit must be accorded for supplying the correct X-ray diagnosis, in his report calls attention to—

1. A spear-like exostosis springing from the superior edge of the acetabulum; furthermore the articulation outline is indistinct.

2. There is fully a ¾-inch overlap (original plate practically life-size); the caudad fragment seen partly through the acetabulum, partly through the femoral head, being shown mesad to that extent.

3. If patient had not been so stout, a series of perspective views might have been obtained that would have afforded data regarding character of displacement and union.

Based upon Section 1 of Carman's report it would seem to be evident that a moderate hypertrophic arthritis is present. It is entirely conceivable that a portion of the gluteo-femoral syndrome is due to exacerbations of this condition.

Technically, it is entirely possible that pressure pains might be largely, if not wholly, relieved in such a condition by an attack directed toward the overlapping fragments.

THE JOHNS HOPKINS HOSPITAL BULLETIN.

It is issued monthly. Volume XXII is now in progress. The subscription price is $2.00 per year. (Foreign postage, 50 cents.) Price of cloth-bound volumes, $2.50 each.

A complete index to Vols. I-XVI of the Bulletin has been issued. Price, 50 cents, bound in cloth.

Orders should be addressed to THE JOHNS HOPKINS PRESS, BALTIMORE, MD.

PERI-TONSILLAR ABSCESS.

By Mactier Warfield, M. D.,
Instructor in Laryngology, Johns Hopkins University.

This abscess is always painful, and at times dangerous. The laryngologist rarely sees one outside of a hospital, for the great majority of them come to the general practitioner, who either treats them after the method generally given in the text-books, a method often unsuccessful, and always dangerous, or frightened by its dangers and mindful of past failures, bears with resignation the sufferings of his patient until the abscess opens of itself. My excuse for this paper is that I wish to present a method of opening these abscesses, one which I have used for some time, that has never failed me, and which I believe to be perfectly safe, hoping that others may try it, in order that we may arrive at a correct judgment as to its value.

By a peri-tonsillar abscess, I mean one which is the result of an infection of the loose connective tissue immediately about the tonsil which presents the symptoms with which we are familiar as belonging to quinsy. Since it is supposed that the starting point of the infection may be anywhere in the peri-tonsillar connective tissue, the resulting abscess has no definite position where we may always look to find it. As it is also accompanied by great swelling and œdema of the mucous membrane over it, the area over which we can get fluctuations is therefore increased, and as the mouth can barely be opened, and hardly anything can be seen of the throat, it becomes impossible to definitely locate the abscess and find its point of greatest fluctuation. Examination by the finger affords the most accurate information, but this gives so much pain that few patients will submit to it.

In opening an abscess the procedure usually given in the text-books is this: when in any particular case an incision is decided upon, it is not attempted, as a rule, to definitely locate the abscess, but the incision is made at a site which experience has shown to be the usual point of greatest swelling, and where pus can be found. This incision is begun at a point opposite the junction of the uvula with the soft palate and about three-eighths of an inch external to the inner border of the anterior pillar of the fauces, and is carried from above downwards about one-third the distance from the point of origin to the lower border of the tonsil. The knife is wrapped to within a half inch of the point, and is plunged into the swelling to the depth of half an inch, care being taken not to wound the tongue on withdrawing it. Often when there have been unmistakable evidences of the presence of pus, and when the incision has been carefully made, the abscess is not opened.

There is hardly anything which occasions the physician greater chagrin than a failure of this kind, or does more to lower his reputation with his patient, who has had his pain increased instead of receiving the promised relief from suffering, and who now considers the doctor the cause of all his troubles. This incision is not without danger. In making it the ascending pharyngeal artery has been cut and the carotid also. Bosworth says that he never opens a peri-tonsillar abscess without a certain feeling of nervousness on that account.

To permit the abscess to open spontaneously has also its dangers. Abscesses have burst in sleep, and the pus entering the air-passages has drowned the patient. Pus has burrowed down and found a way out in the axilla, or entering the pleural cavity has caused death. Most abscesses, when let alone, open of themselves between the fifth and tenth day, but at times this does not happen for five or six weeks, and by that time the patient is reduced to a pitiable condition from pain and want of food and sleep. Sometimes, either through fear of accident, or because of former failures, the patient or his family will not allow the abscess to be opened.

In a long service in the throat clinic of the Johns Hopkins Hospital, it has been possible for me to see a large number of peri-tonsillar abscesses, and to make observations which have led me to hold opinions as to their origin, and the best way of opening them, which differ from those usually held.

In the first place, instead of considering that the infection may enter, and the abscess arise at any point in the peri-tonsillar connective tissue, it seems quite evident that it always starts from the same point, and that point is in the supra-tonsillar fossa, and that the abscess is always the result of the extension of the infection to a cavity which opens into this fossa. This cavity or space is in the connective tissue, and extends outward along the superior border of the tonsil, and downward along its outer border, thus bounding it on two sides. The abscess begins at the supra-tonsillar fossa, and as pus continues to be formed it occupies first that part of the cavity which is above the tonsil and then the part on its outer border. As the part on the outer border of the tonsil becomes distended with pus, it forces the tonsil out of its usual position, and pushes it inward over towards the uvula, making it appear as if it were swollen itself, but its increase in size is only apparent and not real, for the abscess is never within the tonsil, but external to it.

The chief causes of peri-tonsillar abscesses are acute follicular tonsillitis, imperfectly removed tonsils and rheumatism. After an attack of acute tonsillitis, the pain and fever usually disappear at the end of three or four days, and the patient thinks he is getting well. But it is often only the lull before the storm. At the end of twenty-four or thirty-six hours, he feels a sudden sharp, stabbing pain in one tonsil, and that is the beginning of the abscess. The swollen tonsil has carried an inflamed crypt into the supra-tonsillar fossa, and infected it. Or the fossa may be infected by the small chronic abscesses which are the result of leaving parts of tonsillar crypts behind in removing a tonsil.

The abscess which is the result of the acute rheumatic ction, starts as a small, circumscribed, deeply inflamed area r the supra-tonsillar fossa and the adjacent anterior pillar. an be aborted if seen very early by the use of salicylate of a.

Vhatever the cause of the abscess may be and whether it is ge or small, it can always be located in the supra-tonsillar a, which itself can easily be found even where the throat ery much swollen and distorted. This then is the place re the abscess is to be opened in every case.

he necessary incision is made with a curved bistoury, ch is held parallel to the soft palate, with the edge of the le looking forward, the back towards the posterior pillar, the point directed outward towards the ear. The point ntered in the supra-tonsillar fossa, in the angle between the pillars of the fauces as high up as possible, and is passed outward until it meets with an elastic resistance, which is the abscess. This is entered, and the knife is brought out straight forward through the anterior pillar. As a rule the knife does not have to enter more than a half inch to reach the abscess. The cut in the anterior pillar is through swollen mucous membrane and does no harm. A bent probe can then be passed through the opening made in the abscess, over the tonsil and to its outer side, thus demonstrating the existence of the cavity there. As the ascending pharyngeal artery and the carotid are at the back of the knife, they are in no danger of being cut.

This incision, then, has these advantages: it is perfectly safe, it is easily made, and it is always successful.

UMMARIES OR TITLES OF PAPERS BY MEMBERS OF THE HOSPITAL OR MEDICAL SCHOOL STAFF APPEARING ELSEWHERE THAN IN THE BULLETIN.

LEY, F. C., and GOLDSBOROUGH, F. C.
he renal activity in pregnant and puerperal women.—*J. Am. M. Ass.*, 910, lv, 2058.

LEY, F. C., and WINTERNITZ, M. C.
he catalytic activity of the blood in the toxemias of pregnancy.—*Am. . Obst.*, 1910, lxii, 961.

R, J.
he effect of securing the vagi or the splanchnics or both upon gastric notility in the rabbit.—*Am. J. Physiol.*, 1910, xxv, 334.
he prophylactic action of atropin in immediate anaphylaxis in guinea igs.—*Ibid.*, 1910, xxvi, 439.
he effect of vagus section upon anaphylaxis in guinea pigs. Second ommunication.—*J. Exper. M.*, 1910, xii, 638.

R, J., and LEWIS, P. A.
a cause de la mort dans l'anaphylaxie aiguë du cobaye.—*Compt. rend. oc. d. biol.*, 1910, lxviii, 99.
he physiology of the immediate reaction of anaphylaxis in the guinea g.—*J. Exper. M.*, 1910, xii, 151.

, J., and MELTZER, S. J.
he respiratory changes of pressure at the various levels of the posrior mediastinum.—*J. Exper. M.*, 1910, xii, 33.

ER, L. F.
troduction to diseases of the nervous system.—*Osler's Modern edicine*, 1910, vii, 17.
apters on the treatment of cerebrospinal fever, cholera and plague. *Musser and Kelly's System of Therapeutics*, 1910.
e methods of examining the blood of greatest importance for the neral practitioner.—*International Clinics*, 1910, 20th s., iv, 20.
some of the triumphs of modern medicine.—*Empire Club Addresses*, ronto, 1910.
roxysmal-arteriospasm with hypertension in the gastric crises of es.—*Am. J. M. Sc.*, 1910, cxxxix, 631.
e importance of the eugenic movement and its relation to social giene.—*J. Am. M. Ass.*, 1910, liv, 2017.
e prevention of racial deterioration and degeneracy, especially by ying the privilege of parenthood to the manifestly unfit.—*Maryland J.*, 1910, liii, 291.
ctrocardiography and electrophonography as aids in clinical diags.—*Canad. J. M. & S.*, 1910.

R, L. F., HIRSCHFELDER, A. D., and BOND, G. S.
electrocardiogram in clinical diagnosis.—*J. Am. M. Ass.*, 1910, 1350.

, J. M.
erior poliomyelitis and its treatment by muscle ironing.—*Albany Ann.*, 1910, xxxi, 207.

E. B.
ding, or nocturnal orgasms in women as a cause of headaches and erical attacks.—*Trans. Georgia State M. Ass.*, 1910.

OOD, J. C.
nt progress in surgery.—*International Clinics*, 1910, 20th s., i, 252.
ery of extremities, shock, anesthesia, infections, fractures, dislons and tumors.—*Progressive Medicine*, 1910, iv, 163.
gn bone cysts, ostitis fibrosa, giant cell sarcoma and bone aneurism e long pipe bones.—*Ann. Surg.*, 1910, lii, 145.
medical and surgical aspects of tumors, including inflammatory neoplastic formation.—*Wisconsin M. J.*, 1910, ix, 115.
t progress in surgical treatment of malignant growths.—*J. Am. s.*, 1910, lv, 1537.
cal treatment of cutaneous malignant growths.—*Ibid.*, 1910, lv,

BLUMER, GEORGE.
Report of a case of rapidly fatal septicemia due to the staphylococcus albus.—*Yale M. J.*, 1910, xvi, 265.
A report of two cases of typhoid fever beginning with unusual throat symptoms.—*Ibid.*, 1910, xvi, 452.
Food intoxication, snake poisoning, etc.—*Musser and Kelly's System of Therapeutics*, 1910.

BOGGS, T. R.
Alum baths in typhoid fever.—*J. Am. M. Ass.*, 1910, liv, 2124.

BOND, G. S.
Effect of various agents on the blood flow through the coronary arteries and veins.—*J. Exper. M.*, 1910, xii, 575.

BOND, G. S., BARKER, L. F., and HIRSCHFELDER, A. D.
The electrocardiogram in clinical diagnosis.—*J. Am. M. Ass.*, 1910, lv, 1350.

BREM, W. V.
Hexamethyleuamin in the treatment of a case of meningococcus meningitis.—*N. York M. J.*, 1910, xcii, 816.
Studies of malaria in Panama: 1. Clinical studies of malaria in the white race.—*Arch. Int. M.*, 1910, vi, 646.

BREM, W. V., and ZEILER, A. H.
A study of hemoglobin of colored laborers in Panama.—*Arch. Int. M.*, 1910, v, 569.
Ipecac in the treatment of intestinal amœbiasis.—*Am. J. M. Sc.*, 1910, cxl, 669.

BROWN, T. R.
The bacteriology of urinary infections with the urinary findings in these conditions.—*Osler's Modern Medicine*, vi, 218-235
Pyogenic infections of the kidney, ureter and perirenal tissues.—*Ibid.*, 236-272.
Tuberculosis of the kidneys.—*Ibid.*, 273-296.

BRANCH, J. R. B.
The result of an operation for suspending the uterus by the round ligaments.—*Am. J. Obstet.*, 1910, lxii, 680.

BUSH, CAMILLUS.
Observations on brain surgery.—*Calif. State J. of M.*, 1910, viii, 58.
Primary sarcoma of the spleen.—*J. Am. M. Ass.*, 1910. liv, 453.

CAMAC, C. N. B.
The spinal cord lesions in two cases of pernicious (Addisonian) anemia. —*Tr. Ass. Am. Physicians*, 1910; also *Am. J. M. Sc.*, 1910, cxxxix.
A modern and his times.—*The Charaka Club*, 1910, iii.

CAULK, J. R.
Nephrolithotomy and pyelolithotomy.—*Interstate M. J.*, 1910, xvii, 788.

CLARKE, T. W.
The influence of the general health on the conformation of the jaw.—*Am. Orthodont.*, 1910, ii, 8.
The problem of elemental life.—*Science* 1910, xxxii, 719.

CLARKE, T. W., and CURTIS, R. M.
Sulph-hemoglobinemia, with a report of the first case in America.—*The M. Rec.*, 1910, lxxviii, 987.

CLOUGH, P. W.
Clinical experience with the Wassermann reaction in the Johns Hopkins Hospital.—*Am. J. Dermat.*, 1910. xiv. 600.

CLOUGH, P. W., and STUFFENHAGEN, KARL.
Biologische Untersuchungen über die Herkunft von Knochen.—*Berl. klin. Wchnschr.*, 1910, xlvii, 2097.

Cross, E. S.
Some observations on tetany.—*Interstate M. J.*, 1910, xvii. 179.
Hypopituitarism.—*N. York M. J.*, 1910, xcii, 771.

Cullen, T. S.
Some points in the operative technique of vaginal hysterectomy for prolapsus.—*Surg., Gynec. & Obst.*, 1910, x, 307.
A right pelvic kidney; absence of the left kidney; absence of the uterus; both ovaries in the inguinal canals.—*Ibid.*, 1910, xi, 73.
A large cystic tumor developing from the iliopsoas bursa.—*J. Am. M. Ass.*, 1910, liv, 1181.

Cushing, Harvey.
Recent observations on tumours of the brain and their surgical treatment. Abstract of the fourth William Mitchell Banks Memorial Lecture.—*Lancet*, Lond., 1910, i, 90.
Tumors of the brain and meninges. Hydrocephalus.—*Osler's Modern Medicine*, 1910, vii, 418.
The functions of the pituitary body.—*Am. J. M. Sc.*, 1910, cxxxix, 473.
The special field of neurological surgery: five years later.—*Cleveland M. J.*, 1910, ix, 827-863. Also *Johns Hopkins Hosp. Bull.*, 1910, xxi, 325.
Strangulation of the nervi abducentes by lateral branches of the basilar artery in cases of brain tumour.—*Brain*, Lond., 1910, xxxiii, 204.

Cushing, Harvey, and Goetsch, E.
Concerning the secretion of the infundibular lobe of the pituitary body and its presence in the cerebrospinal fluid.—*Am. J. Physiol.*, 1910, xxvii, 60.

Davis, J. S.
Skin transplantation with a review of 550 cases at the Johns Hopkins Hospital.—*Johns Hopkins Hosp. Rep.*. 1910, xv, 307.
The effect of scarlet red in various combinations upon epitheliation of granulating surfaces.—*Ann. Surg.*, 1910, li, 40.
The treatment of scalping accidents.—*Ann. Surg.*, 1910, lii, 721.

Dickson, E. C.
Chronic uranium nephritis in animals.—*Calif. State M. J.*, 1910, viii, 140.
Experimental nephritis.—*Ibid.*, 1910, viii, 359.
Edema formation in guinea pigs in chronic experimental uranium nephritis.—*Proc. Soc. Exper. Biol. & M.*, 1910.

Duffy, R. N.
Dextrocardia in pulmonary tuberculosis.—*J. Am. M. Ass.*, 1910, liv, 2043.

Emerson, C. P.
The diagnostic importance of examination of the feces.—*J. Am. M. Ass.*, 1910. liv, 270.
The termination of pneumonia in cases with recovery.—*Johns Hopkins Hosp. Rep.*, 1910, xv, 103.

Emmons, A. B.
The diagnostic value of the search for spirocheta pallida in the umbilical cord of the newborn.—*Bost. M. and S. J.*, 1910, clxii, 640.

Erlanger, Joseph.
Animal experimentation in relation to practical knowledge of the circulation.—*J. Am. M. Ass.*, 1910, liv, 1680; 1769; 1856.
Role of the practicing physician in the defense of medical research. —*Wisconsin M. J.*, 1910, viii, 543.
Chronic auriculo-ventricular heart block in the dog.—*Wisconsin M. J.*, 1910, viii, 624.
Mammalian heart strips, together with a theory of inhibition.—*Proc. Am. Physiol. Soc.*, 1910; also *Am. J. Physiol.*, 1910, xxv, 16.
Observations on auricular strips of the cat's heart.—*Ibid.*, 1910. xxvi.

Fabyan, Marshall.
The bovine type of tuberculosis associated with three cases of tuberculosis in man.—*Arch. Int. M.*, 1910, vi, 19.
A pathological analysis of 195 cases of lobar pneumonia.—*Johns Hopkins Hosp. Rep.*, 1910, xv, 81.

Finney, J. M. T.
Myositis ossificans traumatica.—*South. M. J.*, 1910, iii, 36.
Appendicitis in children.—*Old Dom. J. M. & S.*, 1910, x, 153.
Resection of the pancreas.—*Ann. Surg.*, 1910, li, 818.

Flexner, Simon.
Antimeningitis serum and the results of its employment.—*Internat. Clin.*, 1909, iv, 19th series, 1. (Issued in 1910.)
The contribution of experimenta, to human poliomyelitis.—*J. Am. M. Ass.*, 1910, lv, 1105.

Flexner, Simon, and Jobling, J. W.
Studies upon a transplantable rat tumor. Monographs. (*Rockefeller Institute for Medical Research*), 1910, i, 1.

Flexner, Simon, and Lewis, P. A.
The nature of the virus of epidemic poliomyelitis. Monographs,—(*Rockefeller Institute for Medical Research*), 1909, liii, 2095.
A report on experimental poliomyelitis.—*Proc. Soc. Exper. Biol. & M.*, 1909. vii, 49.
Epidemic poliomyelitis in monkeys. Fourth note.—*J. Am. M. Ass.*, 1910, liv, 45.
Epidemic poliomyelitis in monkeys. A mode of spontaneous infection. —*Ibid.*, 1910, liv, 535.
Experimental epidemic poliomyelitis in monkeys. Sixth note: ascending nasal infection; characteristic alterations of the cerebrospinal fluid and its early infectivity; infection from human mesenteric lymph node.—*Ibid.*, 1910, liv, 1140.
Experimental poliomyelitis in monkeys. Seventh note: active immunization and passive serum protection.—*Ibid.*, 1910, liv, 1780.
Experimental poliomyelitis in monkeys. Eighth note: further contributions to the subjects of immunization and serum therapy.—*Ibid.*, 1910, lv, 662.
Experimental epidemic poliomyelitis.—*Arch. Pediat.*, 1910. xxvii, 93.
Experimental epidemic poliomyelitis in monkeys.—*J. Exper. M.*, 1910, xii, 227.

Gatch, W. D.
Nitrous-oxide-oxygen anesthesia by the method of rebreathing.—*J. A M. Ass.*, 1910, liv, 775.

Ford, W. W.
On the toxicology of the tutu plant.—*J. Pharm. & Exper. Ther* 1910, ii, 73.
Further observations on the immunization of animals to the pois in fungi.—*Ibid.*, 1910, ii, 145.

Goetsch, Emil.
The structure of the mammalian œsophagus.—*Am. J. Anat.*, 1910, x

Goetsch, E., and Cushing, Harvey.
Concerning the secretion of the infundibular lobe of the pitui body and its presence in the cerebrospinal fluid.—*Am. J. Physiol.*, 19 xxvii, 60.

Goldsborough, F. C., and Ainley, F. C.
The renal activity in pregnant and puerperal women.—*J. Am. M. A* 1910, lv, 2058.

Gorham, L. W.
The radiation of pain in renal calculus with a report of an atypic case.—*Internat. Clin.*, 1910, 20th s., iii, 10.

Halsted, W. S.
End-to-end suture of the intestine by a bulkhead method.—*Tr Am. Surg. Ass.*, 1910, xxviii.

Hamman, Louis.
The heart muscle in typhoid fever.—*Arch. Internal. M.*, 1910, vi, 3
The prevention of tuberculosis. Methods that have failed and oth that now give promise of success.—*J. Out-Door Life*, 1910, vii, 29.

Hamman, Louis, and Wolman, Samuel.
The cutaneous and conjunctival tuberculin tests in the diagnosi pulmonary tuberculosis.—*Arch. Int. M.*, 1910, vi, 690.

Hanes, F. M.
Pneumococcus meningitis.—*Johns Hopkins Hosp. Rep.*, 1910, xv, 2

Herrick, A. B.
Abscess of the liver.—*Surg., Gynec. & Obst.*, 1910, xi, 472.

Hirschfelder, A. D.
Diseases of the heart and aorta.—*J. B. Lippincott Co.*, Philadelph 1910.
Functional tests of cardiac efficiency.—*Internat. Clin.*, 1910, 20th s. iv, 39.
On some points of resemblance between peptone poisoning and anaph lactic intoxication.—*J. Exper. M.*, 1910, xii, 586.
The functional disturbances in paroxysmal tachycardia.—*Arch. Int. M* 1910, vi, 380.
Cutaneous tests with corn products in pellagrins.—*Ibid.*, 1910, vi.

Hirschfelder, A. D., Barker, L. F., and Bond G. S.
The electrocardiogram in clinical diagnosis.—*J. Am. M. Ass.*, 19 lv, 1350.

Hoch, August.
The manageable causes of insanity.—*N. York State Hosp. Bull.*, 19
Constitutional factors in the dementia præcox group.—*Rev. Neurol. & Psych.*, 1910.
The relation of insanity to the psychoneuroses.—*Canad. Lancet*, 191 xliv, 107.
On some of the mental mechanisms in dementia præcox.—*J Abn Psych.*, 1910.

Howard, C. P.
Pneumococcic arthritis.—*Johns Hopkins Hosp. Rep.*, 1910, xv, 22

Howard, C. P., and Duval, C. W.
Chronic aleucemic enlargement of the lymphatic glands.—*Arch. In M.*, 1910, v, 6.

Hunner, G. L.
Treatment of the renal pelvis and ureter by means of the ren catheter.—*Trans. Am. Urol. Ass.*, 1910. Forcible dilatation of the ki ney pelvis as a means of diagnosis.—*Surg. Gynec. and Obst.*, 191 x, 485.
Ectopic gestation from the standpoint of the general practitioner.— *Am. J. Obst.*, 1910, lxii, 409.

Hutchins, H. T.
The reproduction of pain as a means of making differential diagnos —*Boston M. & S. J.*, 1910, clxii, 40.

Kelly, H. A.
Treatment of an anteuterine pelvic abscess by sequestration and drain age.—*Am. J. Obst.*, 1910, lxi, 921.
An operation for umbilical hernia.—*Ann. Surg.*, 1910, li, 694.
A chart to aid in the treatment of cystitis by distentions of the bladd —*Ibid.*, 1910, lii, 664.
Transurethral operations in women.—*J. Am. M. Ass.*, 1910, liv, 16
Excision of the fat of the abdominal wall—lipectomy.—*Surg., Gyne & Obst.*, 1910, x, 229.
Closing incisions in the renal pelvis.—*Ibid.*, 1910, xi, 201.
The ebb and flow of hypnotism since 1660.—*Maryland M. J.*, 1910 liii, 81.

Knox, J. H. M.
The aims and purposes of the new association for the study and pre vention of infant mortality.—*Bull. Am. Acad. M.*, 1910, xi, 1.
The conference on prevention of infant mortality.—*Ibid.*, 1910, xi, 3
The relation of alcohol to infant mortality.—*Ibid.*, 1910, xi, 34.
The need of more complete registration of births.—*Arch. Pediat.*, 1910 xxvii, 881.

Knox, J. H. M., Moss, W. L., and Brown, G. L.
Subcutaneous reaction of rabbits to horse serum.—*J. Exper. M.*, 1910 xii, 562.

Knox, J. H. M., and Schorer, E.
A bacteriological and clinical study of a series of seventy-four cases of diarrhœa in children.—*Johns Hopkins Hosp. Rep.*, 1910, xv, 1

ITTLE, H. M.

Louise Bourgeois and some others.—*Montreal M. J.*, 1910, xxxix, 172.

On pelvimetry and abdominal palpation.—*Ibid.*, 1910, xxxix, 535.

MCCRAE, THOMAS.

Dilatation of the aorta.—*Am. J. Sc.*, 1910, cxl, 469.

The principles of hydrotherapy.—*J. Am. M. Ass.*, 1910, lv, 1639.

Empyema in acute lobar pneumonia.—*Johns Hopkins Hosp. Rep.*, 1910, xv, 167.

Delayed resolution in lobar penumonia.—*Ibid.*, 1910, xv, 277.

ADISON, J. D.

Influenzal septicæmia.—*Am. J. M. Sc.*, 1910, cxl, 527.

Chronic influenzal bronchitis.—*J. Am. M. Ass.*, 1910, lv, 477.

Acute gonorrhœal pyelitis. An illustrative case.—*Wisconsin M. J.*, 1910, viii, 162.

IARSHALL, H. T.

Animal experimentation in relation to protozoan tropical diseases.—*J. Am. M. Ass.*, 1910, liv, 1357.

Pathology of arterio-sclerosis.—*Virginia M. Semi-Month.*, 1910, xv, 388.

Acute endocarditis with lobar pneumonia.—*Johns Hopkins Hosp. Rep.*, 1910, xv. 139.

ARSHALL, H. T., and FREEMAN, A. W.

Report of an epidemic of probable paratyphoid fever.—*Am. J. Public Hygiene*, 1910, xx, 14.

ASON, E. M.

The blood in pellagra.—*Mobile M. J.*, 1910, xvi, 7.

Pellagra.—*Ibid.*, 1910, xvii, 7.

EYER, ADOLF.

The dynamic interpretation of dementia præcox.—*Am. J. Psychol.*, 1910, xxi, 385.

The problems of the physician concerning the criminal insane and borderland cases.—*J. Am. M. Ass.*, 1910, liv, 1930.

RRIS, R. S.

The value of Ehrlich's triacid stain in blood work.—*J. Am. M. Ass.*, 1910, lv, 501.

SS, W. L.

A cutaneous anaphylactic reaction as a contra-indication to the administration of antitoxin.—*J. Am. M. Ass.*, 1910, lv, 776.

Dust and disease.—*J. Out-Door Life*, 1910, vii, 143.

SS, W. L., KNOX, J. H. M., and BROWN, G. L.

Subcutaneous reaction of rabbits to horse serum.—*J. Exper. M.*, 1910, xii, 562.

E, E. L.

ancreatic disease. Its cause and nature. Second edition.—*J. B. Lippincott & Co.*, Philadelphia, 1910.

xperimental cirrhosis of the liver.—*Proc. Soc. Exper. Biol. & M.*, 910; also *Path. Soc. of Phila.*, 1910, xiii, n. s., 145.

he relation of combined intoxication and bacterial infection to necrosis of the liver, acute yellow atrophy and cirrhosis.—*J. Exper. M.*, 910, xii, 367.

nflammation.—*Arch. Int. M.*, 1910, v, 541.

, E. L., and BARKER, B. I.

nzymes and antienzymes of blood serum, with certain degenerative hanges in the liver.—*Proc. Soc. Exper. Biol. & M.*, 1910.

R, WILLIAM.

he Lumleian Lectures.—*Lancet*, Lond., 1910, i, 697; 839; 973.

he pupil symptoms in thoracic aneurysm.—*Practitioner*, Lond., 1910, xxiv, 417.

ertain vasomotor sensory and muscular phenomena associated with rvical rib.—*Am. J. M. Sc.*, 1910, cxxxix, 469.

he faith that heals.—*Brit. M. J.*, 1910, i, 1470.

ODY, F. W.

eart-block associated with infectious diseases.—*Arch. Internal. M.*, 10, v, 252.

RQUET, C.

e cutaneous tuberculin test.—*Arch. Pediat.*, 1910, xxvii, 161.

kzination. *Handbuch der Kinderhulkunde von Pfaundler und hlossmann.* Second edition, 1910, 247.

rumkrankheit.—*Ibid.*, p. 584.

lergie. *Ergebn. d. inn. Med. u. Kinderheilk.*, 1910, v, 459.

hematische Darstellung der Säuglingsernährung zu Unterrichtsecken.—*Ztschr. f. Kinderheilk.*, 1910, i, 111.

e relation of tuberculosis to infant mortality.—*Bull. Am. Acad. M.*, 10, xi, 73.

, J. P., and WINTERNITZ, M. C.

the relation of the catalytic activity of the blood to the number red blood cells in health, and to the number of white blood cells the body temperature in peritonitis.—*J Exper. M.*, 1910, xii, 1.

influence of various organs on the catalytic activity of the blood. *bid.*, 1910, xii, 115.

LPH, R. L.

question of enucleation in purulent panophthalmitis together a brief experimental study of the subject.—*J. Am. M. Ass.*, 1910, 2023.

difficulty sometimes met with in the diagnosis of a subretinal mass. *rans. Am. Ophthal. Soc.*, 1910, xii, 466.

importance of prompt X-ray examinations in penetrating wounds he eyeball where the foreign body can neither be seen nor acted for.—*Trans. Ass. Railway Surgeons*, 1910.

RDSON, E. H.

ew suture—the double figure-of-eight.—*J. Am. M. Ass.*, 1910, liv,

sitic myomata: with a report of an unusual case.—*Surg., Gynec. st.*, 1910, xi, 297.

ussion of nephrotomy by the silver wire method, with a report vo cases.—*Am. J. Dermat. & Gen.-Urin. Dis.*, 1910, xiv, 153.

RIGGS, T. F.

The surgical pathology of the thyroid.—*St. Paul M. J.*, 1910, xii, 284.

ROBB, HUNTER.

The diagnosis and treatment of ectopic pregnancy.—*Ohio State M. J.*, 1910, vi, 1.

A case of suspension of the uterus followed by two normal deliveries and the findings at a subsequent abdominal section.—*Cleveland M. J.*, 1910, ix, 117.

Abdominal section for the removal of a gauze sponge which had been left in the abdominal cavity for nine months.—*Ibid.*, 1910, ix, 434.

ROUS, PEYTON.

The fate of embryonic tissue implanted in the mother.—*Proc. Soc. Exper. Biol. & M.*, 1910, vii, 71.

The behavior of transplanted mixtures of tumor and embryo.—*Ibid.*, vii, 73.

An experimental comparison of transplanted tumor and a transplanted normal tissue capable of growth.—*J. Exper. M.*, 1910, xii, 344.

A transmissible avian neoplasm (sarcoma of the common fowl).—*Ibid.*, 1910, xii, 696.

The experimental production of secondary union between normal and carcinomatous epithelium—pseudo-metaplasia.—*J. Am. M. Ass.*, 1910, liv, 1939.

Metastasis and tumor immunity—observations with a transmissible avian neoplasm.—*Ibid.*, 1910, lv, 1805.

Sarcome du poulet, transplantable et donnant des métastases.—*Compt. rend. Soc. de biol.*, 1910, lxix, 331.

RUSHMORE, STEPHEN.

Cancer of the uterus—a clinical study.—*Boston M. & S. J.*, 1910, clxii, 784.

SAMPSON, J. A.

Intramural abscess of the puerperal uterus.—*Am. J. Obstet.*, 1910, lxi, 385.

SCHENCK, B. R.

A general consideration of the subject of pelvic infections, based upon the study of one hundred consecutive operations.—*J. Michigan State M. Soc.*, 1910, ix, 604.

SLADEN, F. J.

Epidemic cerebrospinal meningitis and serum therapy at the Johns Hopkins Hospital.—*Johns Hopkins Hosp. Rep.*, 1910, xv, 397.

STEINER, W. R.

Peripheral venous thrombosis in pneumonia with report of three cases and a review of those previously recorded.—*Johns Hopkins Hosp. Rep.*, 1910, xv, 189.

STONE, H. B.

Actinomycosis; with a report of two cases from Virginia.—*Virginia M. Semi-Month.*, 1910, xiv, 489.

Intestinal lesions produced by blunt force.—*Ann. Surg.*, 1910, lii, 358.

STROUSE, S.

A rapid stain for frozen sections.—*J. Am. M. Ass.*, 1910, liv, 1614.

STROUSE, S., and HECHT, D'ORSAY.

Fibro-sarcoma of the pons with extensive bone involvement.—*Trans. Chicago Path. Soc.*, 1910, viii, 48.

THAYER, W. S.

On the third heart sound. Compt. rend. xvi^{e} Cong. internat. de méd., Budapest, 1910, sect. vi, méd. int., 2 fasc., 390.

Quelques remarques sur le troisième bruit du cœur. Arch. d. mal. du cœur, des vaiss. et du sang, Par., 1910, iii, 145.

On the commoner types of functional cardiac murmurs.—*Canad. Pract. & Rev.*, 1910, xxxv, 481.

TINKER, M. B.

Teaching the principles of surgery.—*J. Am. M. Ass.*, 1910, lv, 1430.

Surgical treatment of gall stones and inflammations of the biliary tract.—*Buffalo M. J.*, 1910, lxv, 297.

Important factors in diagnosis and treatment of surgical tuberculosis. —*Ibid.*, 1910, lxvi, 68.

VANDERHOOF, DOUGLAS.

The clinical significance of ærophagia.—*J. Am. M. Ass.*, 1910, liv, 679.

Acid-intoxications and their therapeutic indication.—*Old Dom. J. M. & Surg.*, 1910, x, 261.

WARFIELD, L. M.

Cancer of the stomach. An unusual case.—*Wisconsin M. J.*, 1910, viii, 691.

WATTS, S. H.

Rhinoplasty by means of one of the fingers.—*Ann. Surg.*, 1910, li, 191.

Successful enucleation of a meningeal endothelioma involving the motor cortex.—*Old Dom. J. M. & Surg.*, 1910, x, 184.

WELCH, W. H.

Fields of usefulness of the American Medical Association.—*J. Am. M. Ass.*, 1910, liv, 2011.

WHIPPLE, G. H.

The pathogenesis of icterus.—*Pub. Mass. Gen. Hosp.*, 1910, iii, 17.

WIGHT, O. B.

Is operation advisable in fractures of the skull?—*Northwest M.*, 1910, ii, 44.

WILLIAMS, J. WHITRIDGE.

Is pubiotomy a justifiable operation? Second communication based upon a series of 25 successful cases.—*Am. J. Obst.*, 1910, lxi, 722.

Report on the employment of vaccine therapy in gynecology and obstetrics.—*Surg., Gynec. & Obst.*, 1910, xi, 12.

WILSON, GORDON.

The diagnosis of tuberculosis in doubtful cases.—*N. York M. J.*, 1910, xcii, 471.

WINTERNITZ, M. C., and AINLEY, F. C.

The catalytic activity of the blood in the toxemias of pregnancy.—*Am. J. Obst.*, 1910, lxii, 961.

Winternitz, M. C., and Meloy, C. R.
On the occurrence of lipase in human tissues and its variation in disease.—*J. Med. Research,* 1910, n. s. xvii, 107.

Winternitz, M. C., and Pratt, J. P.
On the relation of the catalytic activity of the blood to the number of red blood cells in health, and to the number of white blood cells and the body temperature in peritonitis.—*J. Exper. M.,* 1910, xii, 1.
The influence of various organs on the catalytic activity of the blood. —*Ibid.,* 1910, xii, 115.

Winternitz, M. C., and Rogers, W. B.
The catalytic activity of the developing hen's egg.—*J. Exper. M.,* 1910, xii, 12.
Observations upon the action of salts on the catalase of the blood in rabbits.—*Ibid.,* 1910, xii, 755.

Wolman, Samuel, and Hamman, Louis.
The cutaneous and conjunctival tuberculin tests in the diagnosis of pulmonary tuberculosis.—*Arch. Int. M.,* 1910, vi, 690.

Woolley, P. G.
The relation of human and bovine tuberculosis.—*Cincin. Lancet-Cl.,* 1910, ciii, 644.
Some skin diseases observed in Siam.—*Am. J. Dermat.,* 1910, xiv,

Young, H. H.
Genito-urinary clinic.—*Leucocyte,* 1910, xvii, 186.
Perineal prostatectomy: some conclusions based on a study of cases.—*J. Am. M. Ass.,* 1910, liv, 784.

NOTES ON NEW BOOKS.

Symptomatic and Regional Therapeutics. By **George Howard Hoxie**, A. M., M. D. (*New York and London: D. Appleton & Co., 1910.*)

The title of this work excites curiosity as to its exact scope for as a rule it is not wise for too much attention to be directed to the treatment of symptoms. The temptation—too frequently succumbed to—is to give care rather to the relief of symptoms than to getting at their cause. Obviously in some cases we cannot do anything more than treat symptoms, as in hopeless cases of malignant diseases. In some cases special attention to a particular symptom is important and such a section as is here given on the treatment of itching is excellent, but to treat emaciation as a symptom hardly seems very good therapeutics. The reasons are not evident for placing some conditions under certain headings. Thus it is difficult to see why the serum treatment of diphtheria should be discussed under the heading of "chronic inflammations." Even "regional therapeutics" can hardly justify the placing of typhoid fever in the section dealing with diseases of the digestive tract.

For the consideration of a particular disease the discussion of the treatment of typhoid fever was chosen. There are some points which deserve notice, thus the author says that "it should be remembered that the stools must be green and inoffensive. . . ." Now green stools do occur in typhoid fever, but this is rare and it is hard to understand why they must occur. The direction that "there must be no gas pains" seems rather a curious one. The author does not advocate the bath treatment, but this is not surprising when we read his description of a tub bath (p. 28) in which he says "In giving the bath, one should be careful to keep the patient in the water only a minute or two. . . ." It would be interesting to know the authority for this statement; the reviewer knows of none. It is the custom of many writers to pass criticism on the bath treatment of typhoid fever when it is evident that they do not know the method of carrying it out.

There are some descriptions of treatment which do not seem very rational. Thus in endocarditis with valvular insufficiency it is advised "to strengthen the valves by very carefully graduated exercises and passive movements (Schott or Nauheim treatment)." That the object of this or any other treatment is to strengthen the heart valves is a new point in therapy. Under pneumonia it is advised to give atropine to dilate the capillaries and equalize the blood pressure when the skin becomes clammy and pale. This last phrase is not quite clear but as regards any need of *dilating* the capillaries, the usual opinion is that when the circulation is affected in pneumonia, there is too much vasodilation. Then there is a generally accepted opinion that atropine tends to contract the peripheral vessels. Angina pectoris is discussed under the heading of cardiac neuroses and the treatment here given would not carry one far. There does not seem to be any mention of aneurism at all. Broncho-pneumonia is discussed under the heading bronchitis. This perhaps is regional therapy, but it does not seem likely to aid in obtaining a broad view of therapeutics. In gastric hyperacidity a dose of soda of one to two grains is advised, but it is difficult to share the author's view that this will be efficient. In peritonitis "distressing vomiting and peristaltic frenzy are kept in abeyance by careful gastric lavage." The term "peristaltic frenzy" sounds well, but are the bowels not apt to show absence of peristalsis in peritonitis when the stage of vomiting is reached. In several places the author condemns certain methods of treatment, but still devotes space to describing them (for example, the use of gelatine injections on page 275).

It may be argued that a complete discussion of treatment should not be expected in a work with this title but if so there seems little reason for its appearance. The extracts quoted are enough to suggest doubt as to the value of the work and we cannot recommend it. The whole idea of the book seems a step backward

Nephrocoloptosis. By H. W. **Longyear**, M. D., etc. (*St. Louis: C. V. Mosby Company, 1910.*)

As the title suggests this interesting little volume is an exposition of a relationship supposed to exist between nephroptosis and coloptosis. The interest centers about the nephrocolic ligament, a structure which the author claims to have discovered. It is described as consisting of a number of fasciculi of fibrous tissue, which can be anatomically grouped and easily demonstrated as thus forming a definite band or ligament of considerable tensile strength extending between the right kidney and the ascending colon, and between the descending colon and the left kidney. The fibrous network of this ligament is continuous with that of the fatty capsule of the kidney.

Nephroptosis without coloptosis, it is boldly asserted, does not occur. In fact the prolapsed colon, weighted down with accumulated fecal masses as a result of associated constipation, and tugging on the right kidney by means of the nephrocolic ligament is considered the principal contributory etiological factor in movable kidney.

Acting upon this idea the author has devised an operation for the correction of nephroptosis the essential feature of which is the utilization of the nephrocolic ligament as a substantial supporting structure.

There are chapters dealing with the subject of movable kidney from the standpoints of Anatomy and Pathology, Etiology, Symptomatology, Diagnosis and Treatment; and at the end is appended a somewhat detailed report of 54 cases of nephrocolopexy in substantiation of the author's claims.

The illustrations are numerous, clear and helpful; and the publishers' work is creditably done.

The book will doubtless stimulate surgeons generally to search very carefully for the nephrocolic ligament in all cases operated upon for nephroptosis. It seems very strange that such a definite anatomical structure, of such vital importance etiologically in a very common disorder, as described and pictured by Dr. year should have escaped notice so long. But judgment as real worth must be withheld, of course, until the author's is have been thoroughly tested by other surgeons. Any ite contribution to the study of movable kidney from an gical standpoint should be gratefully received, and justly s careful consideration, in view of the present chaotic state r knowledge upon this subject. For one cannot help being essed by the curious discrepancies and radical differences of on met with when comparison is made between the views fferent authors who have made a special study of movable y. Thus, for example, F. W. Griffith (Johns Hopkins Hosp. XXI, 75) who made a very elaborate and painstaking study dy-shape in relation to movable kidney, concluded that body-shape is more important as an etiological factor all others combined.

so Longyear, however, who holds this to be only one of minor contributory causes, regarding chronic constipation relation to coloptosis as of very much more importance. he explains the much greater frequency of right-sided optosis, since fecal matter does not accumulate in the de-ing colon; and his statistics show that of 155 cases of mov-idney found among 1000 women examined, he met with not gle case occurring on the left side alone.

ffith, on the other hand, reports from a study of both clin-nd operative statistics at the Johns Hopkins Hospital that rrect proportion of right- to left-sided nephroptosis is about to one! He found furthermore that a history of constipa-was obtained in 49 per cent of white women and 70 per of colored women; or, as he says, "White women in whom ble kidney is common do not suffer from constipation as ntly as do colored women in whom movable kidney is un-on."

s evident, therefore, how far we are from any uniformity of n upon this subject at present, and Dr. Longyear is to be atulated on having contributed in this attractive little e so much food for reflection, which it is safe to predict timulate the surgical world to speedily interest itself in a igh test of his original suggestion. E. H. RICHARDSON.

as Vesalius, The Reformer of Anatomy. By JAMES MOORES LL, M. D., St. Louis. Quarto size (10 x 12¾ inches), inted on heavy Normandy vellum, deckle edge, with heavy tension cover to match. A de luxe volume, issued in the ghest style of the typographic art as regards page format, pe cutting, decoration and solidity of ink. Pages XVII +). Fully illustrated. Price $5.00. (*St. Louis: Medical ience Press, MDCCCCX.*)

e has long been need of a publication in English giving, able form, the available data in regard to Vesalius. Burg-s Mémoire (Gand, 1841) and Roth's scholarly biography , 1892) have largely supplied this want for a French and reading profession. It has been a regret to all, interested cal History, that the promised "Vesalius" in the Masters licine series has never appeared, for what is wanted is life of Vesal as Paget gave us of John Hunter and Power lam Harvey in this series. Doubtless Dr. Taylor found e task, and in view of Professor Roth's exhaustive study many years of labor, there must have been hesitation to e same field. However, there may always be something the subsequent biographer—*vide* the long series of orations—and Roth himself has shown, by a number of ers, that the last word on Vesalius was by no means said mprehensive volume.

are many points of view from which a biographical ay be written, and Roth's much annotated "Andreas Vesalius" would, if translated, probably make rather dry and uninteresting reading for the average physician. Few combine the scholar's knowledge with a style suited to all readers.

Though Dr. Ball makes no pretense of having made original studies, his narrative will give to English readers, unfamiliar with Roth and Choulant, a pleasant and helpful picture of Vesal, his contemporaries and his times.

For its interesting introductory chapters and for the review of anatomy in ancient times, it is to be hoped that the volume will be largely read, but as a picture of Vesalius it falls short of one's expectations. The narrative is broken up by the insertion of fragmentary and isolated biographies of Vesal's forerunners and contemporaries to the distraction of the reader's attention from the main theme. To really do justice to the subject would require the pen of a Henry Morley and a knowledge of the 16th century equal to his, and one could wish that he had added a Vesalius to his Jerome Cardan and his Palissy the Potter. His short sketch in Fraser's Magazine in 1853 is an indication of what might have been expected, and he did us a service—to which Dr. Ball refers—in calling Vesal the Luther of Anatomy.

Not only in its content, but typographically, the volume has much deserving of commendation. The Medical Science Press is to be congratulated on the appearance of the work, and the proof-reader, on the scarcity of typographical errors. An "of" is missing from line thirteen, page 76, etc. The book is printed on heavy paper, Normandy vellum, imported from France—a commentary on the protective tariff—which takes the type and blocks of the numerous illustrations as no American made paper can. Unfortunately it has been necessary to use two qualities (pages 81-96 in the copy used for review). The index would seem to be unnecessarily elaborate—a rare and perhaps a good fault.

The attention of medical students should be directed to this volume, though it is rather too expensive a work for the majority of them to hope to possess. H. C.

Urinary Surgery—A Review. By F. S. KIDD, M. B., B. C. (Cantab.), F. R. C. S. (*London: Longmans, Green & Co., 1910.*)

In the preface the author states that his purpose is to supply practitioners of medicine with a practical treatise which will aid them in becoming more familiar with the diseases of the urinary system.

The book, of 412 pages, is divided into five sections: 1. Diseases of the Kidney; 2. Diseases of the Ureters; 3. Diseases of the Bladder; 4. Diseases of the Prostate; and 5. Diseases of the Urethra.

English medical books are usually carefully written; this one, however, is a striking exception, for the English shows a violation of most of the rules of rhetoric and a careless use of those of grammar. Ideas of slight relation to one another are connected by conjunctions and jumbled together in the same sentence; prepositions are misued, verbs are omitted, inelegant expressions are injected here and there, and words are often used which inaccurately express the meaning intended. There is almost an entire lack of coordination and unity in the long sentences and many of them require a second or third reading before the author's meaning is apparent.

A few examples of the author's English construction may be quoted: "The patient should lie up in bed, with the foot-end slightly raised, either on her back, or on her right side, and the attack will pass off in a few hours." "Stone is the commonest cause of single cyst in the kidney met with at operation." Referring presumably to the X-rays which were spoken of in a preceding sentence, he says, "Before their advent stones were approached in the dark." "Intervals of years may intervene." "The symptoms cool down." "The abscess breaks on to the skin." "A triangular shadow in the renal region with a nose pointing downwards with phosphatic urine means ureteric block, ..." and "gross parasites such as hydatid cysts."

The arrangement of the subject matter in short paragraphs with distinctive headings is faulty and in many instances very confusing.

It does not seem necessary in a work of this kind to give the embryology of the kidney and ureter; if the reader does not know it beforehand, he will not be much enlightened after having read the synopsis.

In what should be a very important chapter on renal calculus, there is nothing new, and the arrangement of the facts given is so poor that a clear idea of the subject cannot be obtained.

The discussion of new growths of the kidney is very inadequate, in many places being reduced to simply a naming of the conditions. Inflammations of the bladder and prostate are somewhat better handled, but here again the author falls short.

The pathological descriptions in various chapters for the most part show crudity and unfamiliarity with this part of the subject. Expressions such as "The pathology of spread," "the giant cell systems," "degeneration of the higher cells of the kidney" seem to be without warrant.

In a book intended for practitioners symptomatology is the most important feature, but the signs and symptoms are divided into so many sub-headings and so scattered in various paragraphs and in general so inadequately dealt with that a comprehensive grasp of them is rendered impossible.

In the section on tuberculosis of the kidney in speaking of catheterization of the ureter, the following astounding assertion is made: "Before removal, half an ounce of a one per cent solution of corrosive sublimate is injected through the catheter." This surely would kill all the tubercle bacilli which might have been artificially introduced, but at the same time, it would destroy the ureter and pelvis of the kidney. Another statement in the chapter on Tuberculosis of the Bladder, while not dangerous, is certainly erroneous: "If a young man without venereal taint who usually sleeps well is constantly awakened at night by desire to micturate, the diagnosis is tuberculosis of the bladder."

The treatment of certain diseased conditions is short and in many instances too cursory to be of much help. The operative technique is so briefly described that it is questionable whether any mention of it need have been made.

There is much good material in the book; the author's advice for the most part is sound, his insistence on a thorough examination at the onset of various maladies is commendable, and the surgical principles which he sets forth are, with a few exceptions, correct. If the whole text were entirely rewritten in passable English, the subject matter rearranged, the errors corrected and numerous repetitions omitted the book would have some value; but as it stands, it is at best of doubtful utility.

The Sexual Disabilities of Man, and Their Treatment. By ARTHUR COOPER, Consulting Surgeon to the Westminster General Dispensary, etc. Second edition. Revised and enlarged. Price $2. (*New York: Paul B. Hoeber, 1910.*)

The book is divided into two sections: (1) Sterility and (2) Impotence.

In the first, the author discusses the normal and abnormal characteristics of the seminal fluid, the changes found in the spermatozoa, the various physical defects, and the most common diseases which are held responsible for sterility. At the end treatment is advised for the most usual and important changes found.

Impotence is dealt with under two headings: Secondary and Primary. (1) Secondary impotence is caused by definite morbid conditions such as physical defects and local and general disease. (2) Primary impotence is mainly nervous in origin and only slight, if any, local changes are demonstrable. Three factors are discussed: (1) The psychical element; (2) effect of abnormal seminal emissions; and (3) The result irritation or over-stimulation. At the end a fairly compreh treatment is given.

The book is well and pleasantly written and covers the gr in a fairly satisfactory manner, but in a few places the au has been too brief, and in others, matter has been inserted w might well have been left out. The practitioner or student w knows very little of the subject may find the work helpful, for those who are conversant with the literature it will almost no value.

Surgical After-Treatment. By L. R. G. CRANDON, A. M., M. Assistant in Surgery at Harvard Medical School. Illus tions. Price $6. (*Philadelphia and London:* W. B. Saun *Company, 1910.*)

There are very few surgeons who have not at one time another, in the course of their career, felt the need of a good on "Surgical After-Treatment." Especially helpful must work be to the surgical beginners.

This long felt want is now beautifully supplied by Dr. Cran who is to be congratulated on the success of his book.

Starting out with a chapter on the Sick Room, Nurses' C Posture, other chapters follow telling in clear, concise lang of the care of the patient before and after operation, the thesia, feeding, care of the wound, complications, etc.

Further on in the book the various operations are taken one by one and dealt with specifically, such as for instance Radical Cure of Hernia, Strangulated Hernia, Curettage for tion and Miscarriage, etc.

The last two hundred pages of the book are devoted "Therapeutic Immunization and Vaccine Therapy," written Dr. George P. Sanborn, also of Boston. This is a wise addi to the work as every modern surgeon must be familiar with growing branch of medicine.

But, perhaps the most commendable feature of the whole is the fact that it is distinctly not a narrow and detailed acco of the methods and procedures of one hospital or one institu but rather a sort of condensation, a résumé of the best meth in use at the present day in the various hospitals, both of country and of Europe. One has only to glance at the numer and well-chosen references to the literature to appreciate truth of this statement.

BERTRAM M. BERNHEI

Practical Pathology. By J. SIMS WOODHEAD, M. A., M. D., LL. Fellow of the Royal Society of Edinburgh; Professor of Pa ology in the University of Cambridge. Illustrated. Fou Edition. Price $11. (*London: Oxford University Pr 1910.*)

The welcome accorded the previous editions of Prof. Woodhea book is possibly the best indication of the need of a text of type. As so much time has elapsed since the appearance of third edition, it will be well to briefly review the scope of volume.

The first chapter deals with a method of performing po mortem examinations, the requisites necessary, etc. The criticism one can offer is whether it is really of advantage devote much space to a subject which can only be learned by servation or by actual experience.

The second chapter deals with pathological technique. By the time he reaches his course in pathology the student should familiar with the microscope. On the other hand his knowledg of the examination of fresh tissue is limited and this portion the chapter is more satisfactory. The advantages of the study fresh tissues and injected organs have been neglected to a gr extent with the extensive use of microtomes and improved sta

~~and it is therefore the~~ more important to emphasize itudy of fresh tissue as the author does. This is followed rather complete description of hardening, embedding and ing methods which is doubly valuable since each method is ɔered and these numbers are used continuously through the as guides for the best methods available in the study of fic lesions. This reference system simplifies the student's greatly inasmuch as it puts a definite mode of procedure at isposal for most cases; it is possible, however, that just this sion may be a disadvantage since it will not necessitate any iminating thought on the part of the student.

e third chapter on inflammation begins in the only logical ıer, *i. e.*, the description of cells found in the blood and in ımation. The description is objective with only sufficient y to impress the unsolved cell genesis problems. The re- der of this chapter deals with inflammation and repair as ɔurs in various characteristic tissues. The author's method is as well as in the description of morbid processes in the ıquent chapters is to be strongly commended. First the lesion is described, then after the most appropriate manner rdening and staining the tissue is given, the microscopic ex- ation under definite low and high magnification is detailed. of these latter descriptions are more valuable on account of xcellent illustrations. In some instances these are diagram- : and possibly more valuable for this reason.

e book is unique, its scope is different from every other treatise on pathology and is no doubt just the thing most needed by the student since it puts at his disposal ready methods for the study and interpretation of the usual lesions of pathological anatomy.

The price of this book, however, precludes any very extensive use.

Scientific Memoirs—New Series No. 37. By Officers of the Medical and Sanitary Departments of the Government of India.

Investigations on Bengal Jail Dietaries with Some Observations on the Influence of Dietary on the Physical Development and Well-Being of the People of Bengal. By CAPTAIN D. MCCAY, M. B., etc. Issued under the authority of the Government of India by the Sanitary Commissioner with the Government of India, Simla. Price 4/3. (*Calcutta: Superintendent Government Printing, India, 1910.*)

A very long and thorough report divided into 2 parts, preceded by an Introduction. Part I is divided into 5 chapters: 1, The Food-Stuffs of Bengal Jail Dietaries; 2, The Nutritive Value of Bengal Jail Dietaries; 3, Report on Six Months' Use of Special Diets in Puri Jail; 4, The Effects of the Large Quantity of Salt Given in Bengal Jail Dietaries; and 5, Some Side-Issues of the Investigation. Part II discusses "The Relationship of Food to Physical Development." The special nature of this report makes it one of interest only to the physiologist, or a few students especially devoted to problems of metabolism; such men will find it well worth a careful study.

HOSPITAL STAFF, DECEMBER 1, 1910.

SUPERINTENDENT:
HENRY M. HURD, M. D.

ASSISTANT SUPERINTENDENT:
RUPERT NORTON, M. D.

PHYSICIAN-IN-CHIEF:
LEWELLYS F. BARKER, M. B.

SURGEON-IN-CHIEF:
WILLIAM S. HALSTED, M. D.

GYNECOLOGIST-IN-CHIEF:
HOWARD A. KELLY, M. D.

OBSTETRICIAN-IN-CHIEF:
J. WHITRIDGE WILLIAMS, M. D.

PATHOLOGIST:
WILLIAM H. WELCH, M. D.

PÆDIATRICIAN:
F. CLEMENS VON PIRQUET, M. D.*

PSYCHIATRIST:
ADOLF MEYER, M. D.

ASSOCIATE PHYSICIAN:
WILLIAM S. THAYER, M. D.

ASSOCIATES IN SURGERY:
T. FINNEY, M. D., J. C. BLOODGOOD, M. D.,
EY CUSHING, M. D., HUGH H. YOUNG, M. D.,
R. H. FOLLIS, M. D.

ASSOCIATE IN ORTHOPEDIC SURGERY:
W. S. BAER, M. D.

ASSOCIATE IN ACTINOGRAPHY:
F. H. BAETJER, M. D.

ASSOCIATES IN MEDICINE:
UTCHER, M. B., THOMAS McCRAE, M. D.,
LOUIS HAMMAN, M. D.

ASSOCIATES IN GYNECOLOGY:
USSELL, M. D., T. S. CULLEN, M. D.,
HUNNER, M. D., CURTIS F. BURNHAM, M. D.

ASSOCIATE IN OBSTETRICS:
J. M. SLEMONS, M. D.

RESIDENT PHYSICIAN:
F. J. SLADEN, M. D.

ASSISTANT RESIDENT PHYSICIANS:
P. W. CLOUGH, M. D., W. A. BAETJER, M. D.,
C. G. GUTHRIE, M. D., F. McPHEDRAN, M. D.,
C. R. AUSTRIAN, M. D., J. T. SAMPLE, M. D.,

RESIDENT SURGEON:
C. M. REMSEN, M. D.

ASSISTANT RESIDENT SURGEONS:
G. J. HEUER, M. D., E. GOETSCH, M. D.,
W. D. GATCH, M. D., W. J. C. SHARP, M. D.,
A. O. FISHER, M. D., A. RANDALL, M. D.

RESIDENT GYNECOLOGIST:
E. K. CULLEN, M. B.

ASSISTANT RESIDENT GYNECOLOGISTS:
J. A. SPERRY, M. D. P. I. NIXON, M. D.,
L. H. WATKINS, M. D.,

RESIDENT OBSTETRICIAN:
A. H. MORSE, M. D.

ASSISTANT RESIDENT OBSTETRICIAN:
K. M. WILSON, M. D.

RESIDENT PATHOLOGIST:
G. H. WHIPPLE, M. D.

ASSISTANT RESIDENT PATHOLOGIST:
M. C. WINTERNITZ, M. D.*
T. P. SPRUNT, M. D. (Acting).

HOUSE MEDICAL OFFICERS:
MARY D. ALLEN, M. D., J. C. NEEL, M. D.,
L. W. GORHAM, M. D., J. P. PRATT, M. D.,
R. F. HEGEMAN, M. D., R. E. SEMMES, JR., M. D.,
R. H. MAJOR, M. D., H. A. STEPHENSON, M. D.,
S. R. MILLER, M. D., A. de T. VALK, M. D.,
D. H. MORSE, M. D., HELEN WATSON, M. D.,
C. POWELL, M. D.

---

* Absent on leave.

THE JOHNS HOPKINS HOSPITAL REPORTS.

VOLUME I. 423 pages, 99 plates.

VOLUME II. 570 pages, with 28 plates and figures.

VOLUME III. 766 pages, with 69 plates and figures.

VOLUME IV. 504 pages, 33 charts and illustrations.

VOLUME V. 480 pages, with 32 charts and illustrations.

The Malarial Fevers of Baltimore. By **W. S. Thayer, M. D.**, and **J. Hewetson, M. D.**

A Study of some Fatal Cases of Malaria. By **Lewellys F. Barker, M. B.**

Studies in Typhoid Fever.

By **William Osler, M. D.**, with additional papers by **G. Blumer, M. D.**, **Simon Flexner, M. D.**, **Walter Reed, M. D.**, and **H. C. Parsons, M. D.**

VOLUME VI. 414 pages, with 79 plates and figures.

VOLUME VII. 537 pages with illustrations.

VOLUME VIII. 552 pages with illustrations.

VOLUME IX. 1060 pages, 66 plates and 210 other illustrations.

Contributions to the Science of Medicine.

Dedicated by his Pupils to **William Henry Welch**, on the twenty-fifth anniversary of his Doctorate. This volume contains 38 separate papers.

VOLUME X. 516 pages, 12 plates and 25 charts,

Structure of the Malarial Parasites. Plate I. By **Jesse W. Lazear, M. D.**

The Bacteriology of Cystitis, Pyelitis, and Pyelonephritis in Women, with a Consideration of the Accessory Etiological Factors in these Conditions, and of the Various Chemical and Microscopical Questions involved. By **Thomas R. Brown, M. D.**

Cases of Infection with Strongyloides Intestinalis. (First Reported Occurrence in North America.) Plates II and III. By **Richard P. Strong, M. D.**

On the Pathological Changes in Hodgkin's Disease, with Especial Reference to its Relation to Tuberculosis. Plates IV-VII. By **Dorothy M. Reed, M. D.**

Diabetes Insipidus, with a Report of Five Cases. By **Thomas B. Futcher, M. B. (Tor.)**.

Observations on the Origin and Occurrence of Cells with Eosinophile Granulations in Normal and Pathological Tissues. Plate VIII. By **W. T. Howard, M. D.**, and **R. G. Perkins, M. D.**

Placental Transmissions, with Report of a Case during Typhoid Fever. By **Frank W. Lynch, M. D.**

Metabolism in Albuminuria. By **Chas. P. Emerson, A. B., M. D.**

Regenerative Changes in the Liver after Acute Yellow Atrophy. Plates IX-XII. By **W. G. MacCallum, M. D.**

Surgical Features of Typhoid Fever. By **Thos. McCrae, M. B., M. R. C. P. (Lond.)**, and **James F. Mitchell, M. D.**

The Symptoms, Diagnosis, and Surgical Treatment of Ureteral Calculus. By **Benjamin R. Schenck, M. D.**

VOLUME XI. 555 pages, with 38 charts and illustrations.

Pneumothorax: A historical, clinical, and experimental study. By **Charles P. Emerson, M. D.**

Clinical Observations on Blood Pressure. By **Henry W. Cook, M. D.**, and **John B. Briggs, M. D.**

The value of Tuberculin in Surgical Diagnosis. By **Martin B. Tinker, M. D.**

VOLUME XII. 548 pages, 12 plates and other illustrations.

The Connective Tissue of the Salivary Glands and Pancreas with its Development in the Glandula Submaxillaris. Plates I-III. By **Joseph Marshall Flint, M. D.**

A New Instrument for Determining the Minimum and Maximum Blood-Pressures in Man. Plates IV-X. By **Joseph Erlanger, M. D.**

Metabolism in Pregnancy, Labor, and the Puerperium. By **J. Morris Slemons, M. D.**

An Experimental Study of Blood-Pressure and of Pulse-Pressure in Man. Plates XI and XII. By **Joseph Erlanger, M. D.**, and **Donald R. Hooker, A. B., M. S.**

Typhoid Meningitis. By **Rufus I. Cole, M. D.**

The Pathological Anatomy of Meningitis due to Bacillus Typhosus **William G. MacCallum, M. D.**

A Comparative Study of White and Negro Pelves, with a Consider of the Size of the Child and Its Relation to Presentatio Character of Labor in the Two Races. By **Theodore F. Riggs, M.**

Renal Tuberculosis. By **George Walker, M. D.**

VOLUME XIII. 605 pages, with 6 plates, 201 figures, 1 colored chart.

Studies in Genito-Urinary Surgery.

The Seven-Glass Test. By **Hugh H. Young, M. D.**

The Possibility of Avoiding Confusion by Bacillus smegmatis (Smeg bacillus) in the Diagnosis of Urinary and Genital Tuberculosis Experimental Study. By **Hugh H. Young, M. D.**, and **Joh Churchman, M. D.**

Urethral Diverticula in the Male. By **Stephen H. Watts, M. D.**

An Unusual Case of Urethrorrhagia. By **H. A. Fowler, M. D.**

Paraurethritis. By **John W. Churchman, M. D.**

Use of Ointments in the Urethra in the Treatment of Chronic Urethri **Hugh H. Young, M. D.**

Treatment of Stricture of the Urethra. By **Hugh H. Young, M. D.**, an **John T. Geraghty, M. D.**

The Treatment of Impermeable Stricture of the Urethra. By **Hugh Young, M. D.**

The Treatment of Bacteriuria by Internal Medication. By **John Churchman, M. D.**

Use of the Cystoscope in the Diagnosis of Diseases of the Prostate. **Hugh H. Young, M. D.**

Chronic Prostatitis. An Analysis of 358 Cases. By **Hugh H. Youn M. D.**, **John T. Geraghty, M. D.**, and **A. R. Stevens, M. D.**

Modern Method for the Performance of Perineal Lithotomy. By **Hugh Young, M. D.**

Operative Treatment of Vesical Diverticula. By **Hugh H. Young, M. D.**

Case of Double Renal Pelvis and Bifid Ureter. By **Hugh H. Young, M. D.**

Pyonephrosis Due to Bacillus Typhosus. By **Hugh H. Young, M. D.**, and **Louis C. Lehr, M. D.**

The Use of the X-ray in the Diagnosis of Renal and Ureteral Calculi. **F. H. Baetjer, M. D.**

Nephritis and Hæmaturia. By **H. A. Fowler, M. D.**

The Microscopic Structure of Urinary Calculi of Oxalate of Lime. **H. A. Fowler, M. D.**

Cystinuria with Formation of Calculi. By **H. A. Fowler, M. D.**

Post-Traumatic Atrophy of the Testicle. By **John W. Churchman, M.**

A Description of the Dispensary for Treatment of Genito-Urinary Surgi Cases at the Johns Hopkins Hospital. By **Hugh H. Young, M. D.**

VOLUME XIV. 632 pages, with 97 figures.

Studies in Genito-Urinary Surgery.

The Treatment of Prostatic Hypertrophy by Conservative Perineal Prostatectomy. An analysis of cases and results based on a detailed report of 145 cases. By **Hugh H. Young, M. D.**

Recto-Urethral Fistulæ. Description of New Procedures for their Prevention and Cure. By **Hugh H. Young, M. D.**

The Early Diagnosis and Radical Cure of Carcinoma of the Prostate, being a study of 40 cases and presentation of a radical operation which was carried out in four cases. By **Hugh H. Young, M. D.**

VOLUME XV. 542 pages, with 87 illustrations.

Twelve papers on pneumonia. By **Drs. Chatard, Fabyan, Emerson, Marshall, McCrae, Steiner, Howard** and **Haines**.

A Study of Diarrhœa in Children. By **J. H. Mason Knox, Jr., M. D.**, and **Edwin H. Schorer, M. D.**

Skin Transplantation. By **John Staige Davis, M. D.**

Epidemic Cerebrospinal Meningitis and Serum Therapy at the Johns Hopkins Hospital. By **Frank J. Sladen, M. D.**

VOLUME XVI. 670 pages with 151 figures. (Now in press

Studies in the Experimental Production of Tuberculosis in the Genito-Urinary Organs. By **George Walker, M. D.**

The Effect on Breeding of the Removal of the Prostate Gland or of the Vesiculæ Seminales, or of Both; together with Observations on the Condition of the Testes after such Operations on White Rats. By **George Walker, M. D.**

Scalping Accidents. By **John Staige Davis, M. D.**

Obstruction of the Inferior Vena Cava with a Report of Eighteen Cases. By **J. Hall Pleasants, M. D.**

Physiological and Pharmacological Studies on Cardiac Tonicity in Mammals. By **Percival Douglas Cameron, M. D.**

The set of sixteen volumes will be sold, bound in cloth, for ninety dollars, net. Volume II will not be sold separately. Volumes I, III, IV, V, VI, VII, VIII, X, XI, XII, XIII, XIV, XV, XVI will be sold for $5.00, net, bound in paper, and $5.50, net, bound in cloth. Volume IX will be sold for ten dollars, net.

Orders should be addressed to The Johns Hopkins Press, Baltimore, Md.

The Johns Hopkins Hospital Bulletins are issued monthly. They are printed by the LORD BALTIMORE PRESS, Baltimore. Subscriptions, $2.00 a year (foreign postage, 50 cents), may be addressed to the publishers, THE JOHNS HOPKINS PRESS, BALTIMORE; single copies will be sent by mail for twenty-five cents each. Single copies may also be procured from the BALTIMORE NEWS CO., Baltimore.

THE LIBRARY
11
RECEIVED

BULLETIN
OF
THE JOHNS HOPKINS HOSPITAL

Entered as Second-Class Matter at the Baltimore, Maryland, Postoffice.

ol. XXII.—No. 240.] BALTIMORE, MARCH, 1911. [Price, 25 Cents

CONTENTS.

PAGE
irrhosis of the Liver. Five Different Types of Lesions from which it May Arise. (Illustrated.)
By F. B. Mallory, M. D. 69
yphoid Spine; with the Report of Two Additional Cases with Bony Changes in the Vertebræ.
By Thomas McCrae, M. D., F. R. C. P. 75
rythema Multiforme Iris during the Course of Typhoid Fever.
By H. P. Parker, M. D., and H. H. Hazen, M. D. . . . 79
PAGE
Acute Tuberculous Endaortitis. (Illustrated.)
By Paul G. Woolley, M. D. 82
Report of a Case of Extensive Tiersch Skin Graft. (Illustrated.)
By W. D. Gatch, M. D. 84
Two Cases of Congenital Hæmolytic Jaundice with Splenomegaly. Observations on Hæmolytic Jaundice.
By William S. Thayer, M. D., and Roger S. Morris, M. D. 85
Notes on New Books 96
Books Received 99

CIRRHOSIS OF THE LIVER. FIVE DIFFERENT TYPES OF LESIONS FROM WHICH IT MAY ARISE.[1]

By F. B. Mallory, M. D.

(*From the Pathological Laboratory of the Boston City Hospital.*)

Introduction.—In some organs the late stages of certain sions have received more attention than the beginnings of ese lesions. The emphasis has been placed on the wrong end f the process. This statement is particularly true of the flammatory changes in the liver and in the central nervous stem.

Now, in order to understand a pathological process, it is cessary to find and study its beginning and to trace its ogical development. It is with this view in mind that I ll present to you to-night a study of five different types of y lesions of the liver so that you may see for yourselves the late stages of these lesions resulting in sclerosis would be classed under the term cirrhosis. It will enable you er to appreciate what very different kinds of pathological esses the term covers.

shall not present these different types of lesions in the r of their relative frequency and importance, but in such ence as will throw most light on certain features common hem all, especially the changes in the connective tissue a.

the clinician the term cirrhosis usually means a chronic, essive, destructive lesion of the liver combined with reparative activity and contraction on the part of the connective tissue. This contraction of the connective tissue may lead to obstruction of bile ducts, causing more or less jaundice, and to interference with the flow of blood through the blood vessels resulting in portal congestion and ascites.

The pathologist uses the term cirrhosis in a broader sense. He applies it to all sclerosed conditions of the liver, whether progressive or not, in which destruction of liver cells is associated with real or apparent increase of connective tissue. It is from the pathologists' point of view that I approach the subject.

I shall have to refer first to three pathological conditions which may complicate some of the changes terminating in sclerosis.

The first of these, fatty infiltration, is common but of little significance except that under certain conditions the fat present in the cells seems to serve as nutrition and thus aids to protect to some extent the liver cells containing it from undergoing necrosis as readily as surrounding cells containing none.

The second is chronic passive congestion. When this condition is uncomplicated it seems not to cause disappearance of the liver cells around the hepatic vein in the lobule as is generally taught. The cells disappear as the result of a toxic necrosis complicated with hemorrhage. If, as is usually the case, the necrosis is recent, due to a terminal infection, it is easy to demonstrate the necrotic liver cells in the midst of the red blood corpuscles filling the trabecular spaces. If the necrosis is of longer standing the necrotic cells will have partially or entirely disappeared under the solvent action of polynuclear and endothelial[3] leucocytes. The trabecular spaces, dilated and filled with blood, are readily mistaken for distended sinusoids. As a matter of fact the sinusoids are usually more or less compressed as the result of the hemorrhage. In time the hemorrhage disappears and the sinusoids again dilate. Owing to the condition of congestion the liver cells do not regenerate. Consequently, in time, the trabecular spaces shrink and the connective tissue contracts and thickens, although it does not increase in amount, and the liver by its consistence may suggest a mild uniform type of sclerosis.

---

[1] ad before the Johns Hopkins Hospital Medical Society, Nov. 0.

The third and most important pathological condition to which I must refer is general bile stasis due usually to obstruction of the common bile duct by a calculus or by a tumor. This condition leads to marked dilatation of the bile capillaries around the hepatic vein, to rupture of them, and to the escape of masses of inspissated bile into the lymph space between the liver cells and the wall of the sinusoid. Here the bile is incorporated by endothelial leucocytes and gradually dissolved. After solution it seems to pass, perhaps by osmosis, directly into the blood stream, not along the lymph channels to the thoracic duct. Apparently uncomplicated bile stasis does not result in any sclerotic process around the hepatic veins where the chief lesion is located and it certainly does not around the portal vessels.

I. Toxic Cirrhosis.

A fairly common affection of the liver is necrosis of the cells around the hepatic vein, the so-called central necrosis, due to toxins in the circulation. It is a frequent terminal lesion. Occasionally the necrosis is limited more or less definitely to the midzonal region. This type of lesion may be slight, or very extensive involving nearly all the cells in a lobule. It is usually quite uniformly distributed throughout the whole liver. In the milder degrees of necrosis the liver cells are quickly invaded by polymorphonuclear or endothelial leucocytes (Fig. 1) or by both, dissolved, and removed. If the patient survives, the liver cells usually regenerate and the liver lobules are restored to their normal appearance. Sometimes, however, the liver cells do not regenerate. Then the walls of the sinusoids collapse, the lobules shrink, and the connective tissue around the hepatic veins appears thickened just as may happen in connection with chronic passive congestion. Experimentally it has been shown that this form of lesion may be produced by chloroform narcosis and that regeneration will quickly take place.

Occasionally this type of necrosis is very extensive so that in some lobules every liver cell is killed. If the patient survives, the necrotic liver cells are invaded and so quickly removed by the action of leucocytes (Figs. 2 and 3) that in five or six days the liver will diminish in weight from 1500 grams to 600 or 500 grams or even less. The liver will be perfectly uniformly lessened in size, and flabby to the touch. This is the early stage of so-called acute yellow and red atrophy of the liver. If the patient still survives, active regeneration takes place, the liver cells giving rise to new liver cells, bile duct epithelium producing bile duct epithelium. As a result of this active regeneration those parts of the liver where liver cells persist rapidly enlarge and the lobules assume more or less completely their former shape, or perhaps undergo compensatory hypertrophy. These are the yellow bile-stained areas of acute yellow atrophy of several weeks' duration. In those parts of the liver where all the liver cells were killed, the bile ducts (Figs. 4 and 5) grow a third or half the way towards the hepatic vein and then stop. They do not produce liver cells. The lobules are much diminished in size, the leucocytes disappear from the trabecular spaces, the sinusoids are dilated. These are the red parts of a case of acute yellow atrophy of two to several weeks' standing.

This type of lesion teaches two things that are of importance in considering the other types of lesions which result in cirrhosis. First, that simple necrosis of liver cells without injury to blood vessels and connective tissue stroma, does not result in proliferation of connective tissue. The connective tissue which is there shrinks together and thickens, leading to an apparent but not real increase of it. Second, that liver cells regenerate only from liver cells. The bile ducts lengthen owing to proliferation of bile epithelium but they cannot form liver cells.

Various degrees of this series of lesions known under three different names, central necrosis, acute yellow and red atrophy and cirrhosis, are not, I believe, so infrequent as is generally supposed. It ought to be possible to recognize the resulting type of cirrhosis long after the acute lesion is over even without a clinical history to help. Two points are of diagnostic value: the very irregular distribution of the connective tissue as seen on gross examination: and the preservation of the shape of the lobules, much shrunken, in the sclerosed parts. Whether or not continued contraction of the connective tissue may in time lead to obstruction of bile ducts and blood vessels resulting in jaundice and ascites, I am at present unable to say.

It is of interest that this type of cirrhosis is of acute origin; therein it differs from the four other varieties which are all of a more or less chronic nature.

---

[3] The endothelial leucocyte arises by proliferation and desquamation of endothelial cells lining blood and lymph vessels. It emigrates from vessels like the other leucocytes, multiplies by mitosis in the vessels and tissues like the lymphocyte, and possesses one especially distinguishing property, that of being under certain circumstances very phagocytic for the other leucocytes as well as being able to incorporate red blood corpuscles, various microorganisms, and foreign bodies of all sorts. This leucocyte is known by various names, the large mononuclear of the blood, the nongranular leucocyte, the macrophage, etc. Its origin is best studied in the early lesions of typhoid fever, in very young miliary tubercles, and experimentally by the subcutaneous injection of agar.

II. Infectious Cirrhosis.

e second type of cirrhosis I shall term infectious cirrhosis
se it is due to the presence of bacteria in the lesions. In
:perience it is comparatively rare. Bacteria may and do
access to the liver by direct continuity and through the
ic artery, the portal vein, and the bile ducts. It is only
'ection through the bile ducts that I shall speak here, as
eems to be the only form of bacterial infection which
to a dictinct form of cirrhosis.

'ection through the bile ducts, when there is bile stasis
gall stone or other obstruction, not infrequently leads to
:ion with various bacteria and to necrosis (Fig. 9),
s-formation, and death. A rarer form of invasion some-
takes place along apparently normal bile ducts and leads
ery characteristic type of cirrhosis. It is to this variety
ection that I wish to call your attention.

experience of the early stages of the process is limited
o livers which agree very closely in their gross and
scopic appearances although the infection is of longer du-
ı in one than in the other. Both were from children, a
of twelve and a boy[4] of three. At post mortem examina-
:he livers were two to three times the normal size and
increased in consistence. The surface and cut section
smooth. Clinically jaundice and enlargement of the
were prominent symptoms.

at the infecting organism is I do not know as infection
ot suspected and no cultures were taken. The bacteria
ıt in the acutest lesions in the girl are slender bacilli
7). In many ways the lesions in the liver may be said
respond to the chronic process produced in the kidney by
lon bacillus.

ection is spread chiefly through the bile ducts but the or-
ns have also invaded the surrounding connective tissue
re spreading through it. The pathological changes are
ed almost entirely to the region around the portal ves-
d are extending quite uniformly toward the hepatic vein
ı lobule. The lesion is by nature chronic. It is active
preading in many places; quiescent and healing in

bile ducts (Fig. 8) frequently show more or less dila-
and in some places are filled with polymorphonuclear
tes (Fig. 10), in other places with endothelial leuco-
Fig. 8). Here and there where the process is active
duct epithelium is necrotic or gone and the exudation
ding into the surrounding tissue (Fig. 10). Here the
lead to necrosis of the liver cells, of the blood vessel
lium and of the fibroblasts, and to an acute inflamma-
date consisting of polymorphonuclear leucocytes and
Where the process is less active and the bacteria have
the exudation consists chiefly of endothelial leuco-
ny of which are phagocytic and contain fragments of
itotic figures in endothelial leucocytes are found occa-
Lymphocytes are present in relatively small numbers. The lymphatics (Fig. 6) in the capsule of the liver are in places distended and filled with endothelial leucocytes and a little fibrin.

Proliferative activity on the part of the fibroblasts is well marked and evidently follows the direct injury done the connective tissue cells by the toxins from the bacteria; in other words it is simple regeneration.

As a result of the exudation around the portal vessels, of the encroachment of the process on the liver cells, and of the proliferative activity on the part of the fibroblasts, the portal tissues show up as broad bands running very regularly between the lobules of the liver cells (Fig. 11).

In those parts of the liver where the lesion is older and the exudation is less active the bile ducts are more or less dilated and often appear considerably increased in number as though a diffuse bile duct adenoma were present. This appearance is probably due to contraction following marked dilatation and stretching of the ducts when the lesion was more acute. In those parts of the liver where complete repair has taken place this same apparent increase in the size and number of the bile ducts in the midst of abundant scar tissue is still noticeable, at least in the early cases.

In many places the inflammatory exudation in the smaller bile ducts has led to occlusion of them and to obstruction to the outflow of bile which appears in the ducts and bile capillaries above the point of obstruction in the form of yellowish green inspissated masses. The obstruction is focal only, not general and complete; therefore, the resulting jaundice is not intense.

The characteristics of this type of cirrhosis, while the infectious process is still active, are apparently the following:

The lesion spreads very uniformly from the portal vessels toward the hepatic veins, rarely cutting into a lobule. As a result the true lobular arrangement is more or less perfectly preserved. The bile ducts are often dilated and tortuous, so that they appear increased in number. The injury done the fibroblasts leads to active regeneration on their part and to the production of abundant connective tissue. As the result of the extensive inflammatory exudation and of the regeneration of the connective tissue the liver is much increased in size. The surface and cut section are comparatively smooth, perhaps owing to the even distribution of the inflammatory process.

Two cases of congenital jaundice with a uniformly distributed cirrhotic process and obliteration of the common bile duct show microscopically a marked increase of connective tissue around the portal vessels and are undoubtedly due to intrauterine infection extending along the bile ducts (Fig. 12).

III. Pigment Cirrhosis.

A third form of cirrhosis which deserves mention is that known as pigment cirrhosis, occurring in cases of hemochromatosis. It appears to be due entirely to mechanical causes. Endothelial leucocytes filled with blood pigment collect often in great numbers in the lymphatic spaces and vessels

---

y by Dr. O. R. Mabee.
y by Dr. H. A. Christian.

of the liver, chiefly around the portal vessels (Figs. 13 and 14) but to some extent around the hepatic vein and irregularly throughout the lobule between the liver cells and the walls of the sinusoids. Whether they emigrate from the sinusoids after becoming filled with pigment, or absorb it like the liver cells and bile epithelium from the hemoglobin dissolved in the serum and lymph cannot be determined. But after they are filled with pigment they unquestionably are able to migrate. Wherever they collect in numbers they seem to injure the connective tissue mechanically by stretching it. In consequence there is a certain amount of regeneration on the part of the fibroblasts so that more or less sclerosis (Fig. 14) is produced.[5]

A similar increase of connective tissue is caused in the same way under similar conditions in the pancreas, adrenals, and lymph nodes. In time more or less of the pigment is dissolved by the action of the endothelial leucocytes, which then disappear, leaving the connective tissue behind as the only remains of the process.

This lesion, like infectious cirrhosis, may result in the acute stage in a large, smooth liver weighing in one instance, from a woman, 2500 grams. The primary injury seems to be done to the connective tissue. By contraction of this connective tissue later, more or less injury is probably caused to the liver cells.

The sclerosis which occurs in the liver and other organs in the pathological condition known as hemochromatosis is perfectly analogous to that which takes place in the lungs and peribronchial lymph nodes as the result of the inhalation of large amounts of carbon. Endothelial leucocytes carry much of the pigment into the walls of the alveoli and from there to the lymph spaces and vessels around the bronchi and larger blood vessels. Many of the cells remain packed in these situations and lead to considerable increase of the connective tissue.

Many of the cells in the lymphatics are carried to the peribronchial lymph nodes. At first they lie free in the lymph sinuses but soon migrate into the parenchyma when they lead to increase of connective tissue and secondarily to gradual disappearance of the lymphocytes. Some of the endothelial leucocytes filled with pigment migrate into the capsule of the lymph node and into the adjoining fat tissue.

This type of cirrhosis is characterized by pigmentation, by a very uniformly distributed increase of connective tissue, and by a smooth surface of the liver, externally and on section. It may attain a fairly large size. The increase of the connective tissue seems to be due to mechanical causes only.

IV. Syphilitic Cirrhosis.

Syphilitic infection of the liver is usually divided into two types, the congenital and the acquired. In the congenital type a diffuse lesion predominates, in the acquired a focal lesion; but the two types of lesions are often combined in the congenital form and may coexist to some extent in the acquired.

The primary, essential lesion produced by the treponema pallidum is best studied in chancres removed before necrosis has begun and in the liver and other organs of cases of congenital syphilis. The so-called tertiary lesions would probably be equally serviceable for study if they could more often be obtained before the stage of necrosis.

In studying syphilitic lesions it is necessary at our present stage of technical development, to prepare two parallel serial sections, the one stained by Levaditi's method after fixation in formaldehyde so as to demonstrate the causative agent, the other by various methods after fixation in Zenker's fluid to show the tissue reaction. When this is done it is found that the treponemata, present often in great numbers in the primary as well as in the congenital lesions, are situated in the minute lymph spaces between the cells and especially between the fibrils. They occur most numerously in the connective tissue between the collagen fibrils everywhere within the area invaded including that in the intima of arteries and veins. The injurious action of the organisms is exerted chiefly if not exclusively on the fibroblasts which are thereby stimulated to active regeneration, as a result of which much fibrous tissue is produced. This leads in part at least to the hardness of the primary lesion and to the sclerosis of the liver and other organs in congenital cases.

In the congenital lesions the tissue reaction often does not go beyond this stage. In the primary and tertiary lesions, however, the reaction is more intense. As a result there is added to this proliferation of fibroblasts an inflammatory infiltration consisting chiefly of lymphocytes including plasma cells, often also of numerous eosinophiles. Under certain conditions giant cells are formed from the endothelium lining the smaller blood vessels and also perhaps the lymph vessels. These giant cells may occur in chancres, in gummata, and especially in tertiary lesions of the skin. They are due to the presence of the treponemata within the blood and lymph vessels and to their action on the endothelial cells. The resulting giant cells often contain treponemata in large numbers.

The same lesion of proliferation of fibroblasts taking place in the walls of veins and arteries, especially in the intima leads to narrowing and more or less complete occlusion of many of the smaller vessels. The areas thus deprived of nutrition gradually undergo necrosis (gumma formation) which results in an active inflammatory exudate of serum and of endothelial leucocytes (caseation); less often of polymorphonuclear leucocytes (suppuration). With the occurrence of the necrosis and of the acute inflammatory exudate the treponemata as a rule rapidly disappear from the lesion and the area affected tends in time to heal, owing to a local immunity being apparently produced by the leucocytosis. In this respect the focal lesions in syphilis differ materially from those in tuberculosis which tend to spread indefinitely.

Reverting now to the liver we find that in congenital syphilis the treponemata injure primarily the connective tissue cells, especially those lying between the liver cells and the walls of the sinusoids. As the result of the active and con-on of the fibroblasts due to efforts at regen- ı, the connective tissue increases greatly in amount. ; shown by the fact that where the treponemata are most ous (Fig. 15) the connective tissue is most abundant 16). Later as the collagen fibrils contract the liver re compressed and more or less atrophy accordingly re- This diffuse type of lesion, due to primary increase of tive tissue and secondary atrophy of liver cells, is per- well recognized as characteristic of congenital syphilis. ot infrequently complicated with focal lesions (miliary rger gummata) due to occlusion of the sinusoids, necro- the liver and other cells in the area affected, and in- ıatory infiltration with serum and polymorphonuclear or elial leucocytes.

---

[5] See Cirrhosis Hepatis Anthracotica, by W. H. Welch, Johns Hopkins Bulletin, 1891, vol. II, 32, where I should interpret the origin of the sclerosis in the same way.

cquired syphilis the early lesion in the liver is diffuse 17) and similar to that in congenital syphilis but occurs ger and smaller foci only and usually leads to necrosis flammatory infiltration, forming the characteristic gum- of this type of infection, which later may heal and t, resulting in deep scars and more or less lobulation liver.

is reading of the lesions occurring in syphilis is correct, lthough the gross manifestations are many and varied, llular reaction caused by the treponema pallidum is ally the same in all of them and varies only in degree, varying conditions of injury and reaction and of local neral immunity.

V. Alcoholic Cirrhosis.

he chronic, progressive, so-called alcoholic, type of is there occurs a peculiar form of necrosis of the liver hich seem to be characteristic of it. The cytoplasm of s first undergoes a degenerative change in consequence h an irregular, coarse, hyaline meshwork (Fig. 18) ap- ı it. This meshwork stains deeply with eosin and with tungstic acid hematoxylin after fixation in Zenker's This degenerative change may attack single cells o large groups (Fig. 19) of them: it may occur focally diffusely. The affected cells may be situated in any the lobule, but lie most commonly, perhaps, in the f the portal vessels, and sometimes are sharply limited location.

ffected cells and the nuclei within them are usually After the hyaline change has reached a certain de- intensity the cells are surrounded and invaded by s polymorphonuclear (Fig. 20) or endothelial (Fig. ocytes (sometimes the one, sometimes the other), ssolve the cells, the hyaline material last, and thus ut their disappearance.

with this hyaline change and destruction of the liver e occurs active regeneration as evidenced by occa- totic figures in adjoining liver cells. There is also less proliferative activity on the part of the fibro- lting in increase of connective tissue.

ifferent processes of hyaline degeneration ending in necrosis, of leucocytic infiltration, of regeneration of liver cells, and of increase in the amount of connective tissue, when extensive, diffuse, and acute, lead to considerable increase in the size and weight of the liver (2400 grams in one instance). The surface of such a liver is smooth and on section the cut surface is uniformly even, the lobulation indistinct, and the consistence much increased so that the liver tissue tears with difficulty. In other cases the various changes are much less extensive and hence more chronic because they do not cause death so quickly.

Even in the latest stages of alcoholic cirrhosis, however, it is usually possible to find liver cells undergoing the peculiar hyaline change which seems to be characteristic of this process. Still it is not possible to deny that this destructive hyaline change may cease entirely and leave nothing but the sclerosis as evidence of what has taken place.

The increase in the amount of connective tissue causes trouble later when it contracts by occluding bile ducts and blood vessels here and there throughout the liver. Obstruction of the bile ducts results in focal bile stasis so that scattered areas appear dark green. In these areas the bile capillaries are often greatly distended and in places ruptured so that masses of inspissated bile have escaped into the lymph spaces between the liver trabeculæ and the walls of the sinusoids. Here the masses are taken up by endothelial leucocytes and dissolved just as in the ordinary generalized bile stasis due to obstruction of the common duct.

It is not at all uncommon to find all these different processes (hyaline degeneration, leucocytic infiltration, regeneration, proliferation of connective tissue, and focal bile stasis) present in one and the same liver section.

The obstruction to the general flow of blood through the vessels resulting in portal stasis and ascites needs no mention here.

This type of cirrhosis is very commonly complicated by fatty infiltration (Fig. 21) which leads to marked increase in the weight of the liver (3315 and 3580 grams in two instances, and greater weights are on record). As a rule the clinician's diagnosis of hypertrophic cirrhosis proves to be of this nature. So far as can be determined from histological observation, the presence of the fat interferes in no way with the degenerative process. Cells filled with one or more fat vacuoles undergo hyaline change like the others.

The cause of the increase of the connective tissue in this type of cirrhosis is not perfectly obvious. The primary injury affects the liver cells and is followed by more or less regeneration of them. We have seen perfectly clearly in the first type of cirrhosis (that following extensive central necrosis), that injury to the liver cells does not result in proliferation of fibroblasts. On the other hand we have, in alcoholic cirrhosis, around and invading each necrotic cell, an acute inflammatory exudate of leucocytes which must cause more or less stretching of the connective tissue. The injury which results in proliferation of fibroblasts seems, therefore, as in pigment cirrhosis to be mechanical in origin, not toxic.

If we leave tumors out of the question, the only other common cause, besides direct toxic or mechanical injury to fibroblasts, which stimulates them to proliferate is the presence of fibrin and that plays no part in this form of cirrhosis.

It has long been a much disputed point, chiefly with reference to the alcoholic type of cirrhosis, whether the number of bile ducts in certain cases is greatly increased or whether many of them are not compressed columns of liver cells. The type of necrosis following central necrosis shows that bile ducts may grow out to a considerable distance towards the hepatic vein. In infectious cirrhosis a similar prolongation of bile ducts may occur. On the other hand the diffuse form of syphilitic cirrhosis shows that liver cell trabeculæ may be greatly compressed so as to resemble to some extent bile ducts. Therefore, it is theoretically possible that both true and apparent bile duct formations may occur in alcoholic cirrhosis. As a matter of fact both probably do. If these so-called bile ducts are carefully studied after proper staining it will often be found that in some of the epithelial cells composing them hyaline material similar to that in the degenerating liver cells is present (Figs. 23 and 24). Likewise in alcoholic cirrhosis complicated with fatty infiltration fat vacuoles will occasionally be found in the cells (Fig. 24) which look like bile duct epithelium. The presence of the fat vacuoles and of the hyaline material proves beyond question, it seems to me, that the cells containing them are compressed liver cells and not bile duct epithelium.

The terms hypertrophic and atrophic cirrhosis cause the student and the clinician much trouble. This analysis of these five types of lesions shows that we may get a large, hypertrophied, smooth liver in at least three of them, in infectious, pigment, and alcoholic cirrhosis. It is due in each instance to an extensive, diffuse, acute process. If the acute lesion ceases and healing takes place, or if the process is of moderate intensity and long duration so that healing and scar tissue are more prominent than degeneration and exudation, the liver will diminish in size below the normal. The cirrhotic liver following central necrosis is necessarily at all stages below the normal in weight.

Atrophic cirrhosis simply means a liver in which a large proportion of the liver cells have been destroyed and have disappeared, while the existing and new-formed connective tissue have been rendered unduly prominent.

The terms monolobular and multilobular cirrhosis are also extremely confusing. They state only a relation between masses of liver cells which rarely correspond to liver lobules and strands of connective tissue. They do not in the least explain the nature of the process. In infectious cirrhosis the lesion is confined quite uniformly to the portal vessels: the same is true to a less degree of pigment cirrhosis. If, after old custom, the hepatic vein is taken as the center of the lobule, then these two types of cirrhosis may be said, perhaps, to deserve the term monolobular.

In syphilitic cirrhosis of the diffuse type the sclerosis spreads quite evenly throughout every lobule.

In cirrhosis following central necrosis, large groups bules are completely sclerosed, while other large groups perfectly normal. The lesion is most irregular in dis tion.

In alcoholic cirrhosis the distribution and intensity degenerative process vary greatly in different cases, a increase of the connective tissue follows in the same lin often cuts into lobules in every direction. At other ti is fairly regular in its distribution. As a rule, howev lobular arrangement is quickly distorted. Hepatic vei hard to find. Sometimes the more normal areas are sm other times large so that on gross examination either mono- or multilobular, might be appropriate. It mus be borne in mind that regeneration of liver cells plays a portant rôle in alcoholic cirrhosis and may lead to com tively large areas of newly formed liver cells, showin lobular arrangement, containing no bile ducts, and some regarded as adenomata.

It would seem much wiser to discard these terms whic not explain and serve only to confuse. They emphasize wrong end of a pathological process and represent only result of two forces acting against each other, the expan efforts of regenerating liver cells, the contracting force o proliferated fibroblasts which tend to squeeze the surrou liver cells into the narrowest compass, namely, into spher masses.

Granting that cirrhosis may arise in the ways descr from at least five different types of lesions, is it possible, i case of a given sclerosed liver, to determine what the na of the acute process was to which it owed its origin? I am clined to think that in most cases, perhaps in all, it is pos to do so, if the characteristics of each type are clearly c prehended and if the sclerosed liver is carefully examined.

CONCLUSIONS.

At least five different types of lesions may terminate cirrhosis (sclerosis) of the liver; one is acute, the other more or less chronic in character.

Toxic cirrhosis (following extensive central necros demonstrates clearly three facts:

1. That when all the liver cells of a lobule are destr the bile ducts grow out a certain distance towards the hep vein, but that they do not produce liver cells.
2. That liver cells regenerate only from liver cells, ne from bile duct epithelium.
3. That fibroblasts (connective tissue cells) do not p liferate when liver cells alone are destroyed.

The other four types of lesions terminating in cirrhos show that fibroblasts multiply (regenerate) only when fib blasts themselves have been injured or destroyed and th lead to increase of the connective tissue.

The so-called alcoholic type of cirrhosis is characterized b a peculiar hyaline degeneration of the cytoplasm of the liv cells preceding necrosis. In this same type of cirrhosis th contraction of the connective tissue frequently compress groups of liver cells so that they may resemble bile ducts

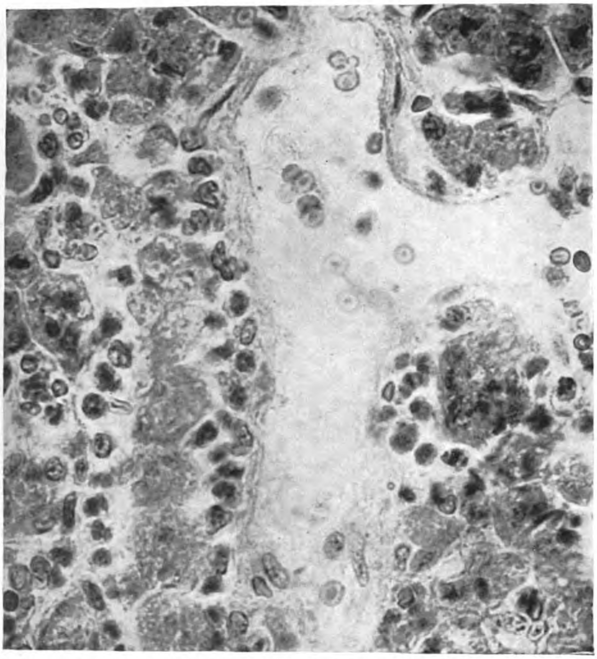


Fig. 1.—First stage of toxic cirrhosis. Necrosis of liver cells around hepatic vein (central necrosis): invasion by polymorphonuclear leucocytes which lie mostly between the necrotic liver cells and the walls of the sinusoids.

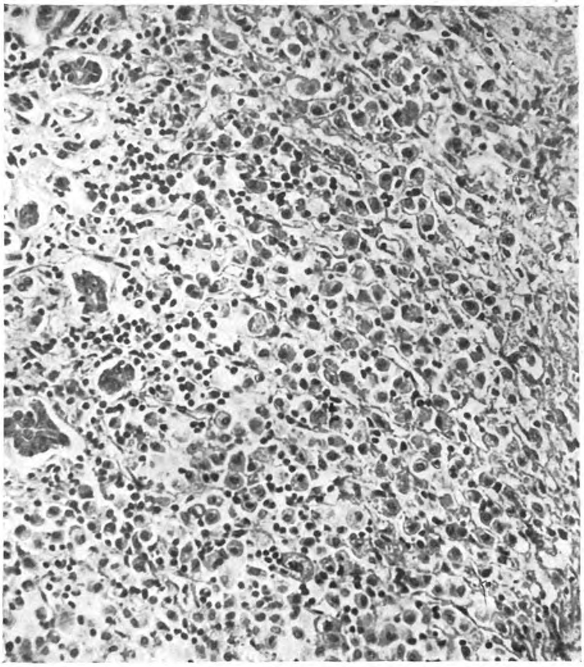


Fig. 2.—Second stage of toxic cirrhosis. Acute yellow atrophy following extensive central necrosis. Liver cells all destroyed and removed; place occupied by large numbers of endothelial leucocytes.

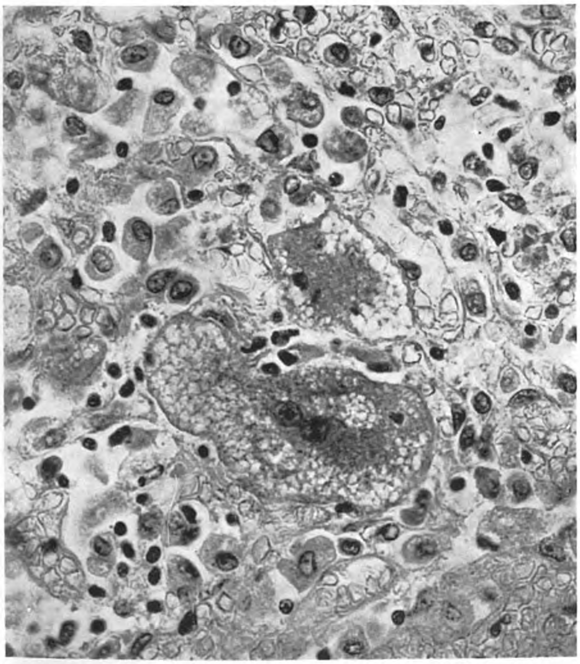


Fig. 3.—From same case as Fig. 2 showing a small group of liver cells from which regeneration may take place.

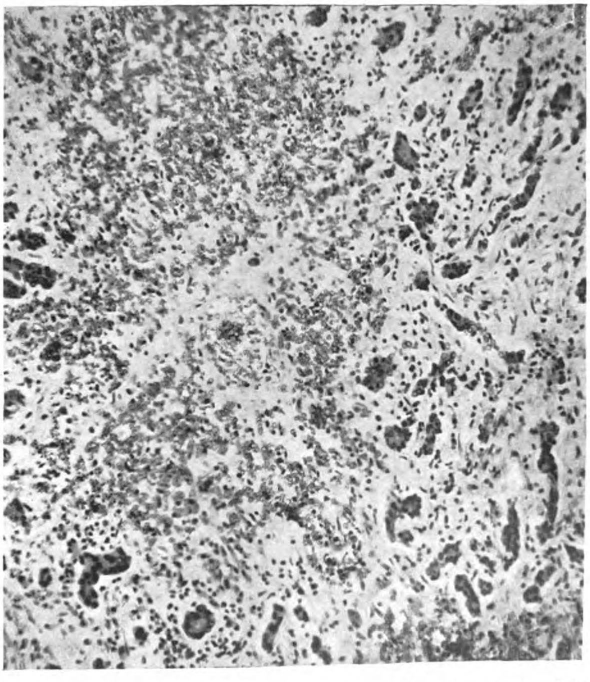


Fig. 4.—Late stage of toxic cirrhosis. Lobule of liver from acute yellow atrophy after repair has taken place No regeneration of liver cells; sinusoids filled with blood; bile ducts have extended part way towards the hepatic vein and then stopped; contraction and thickening but no increase of connective tissue.

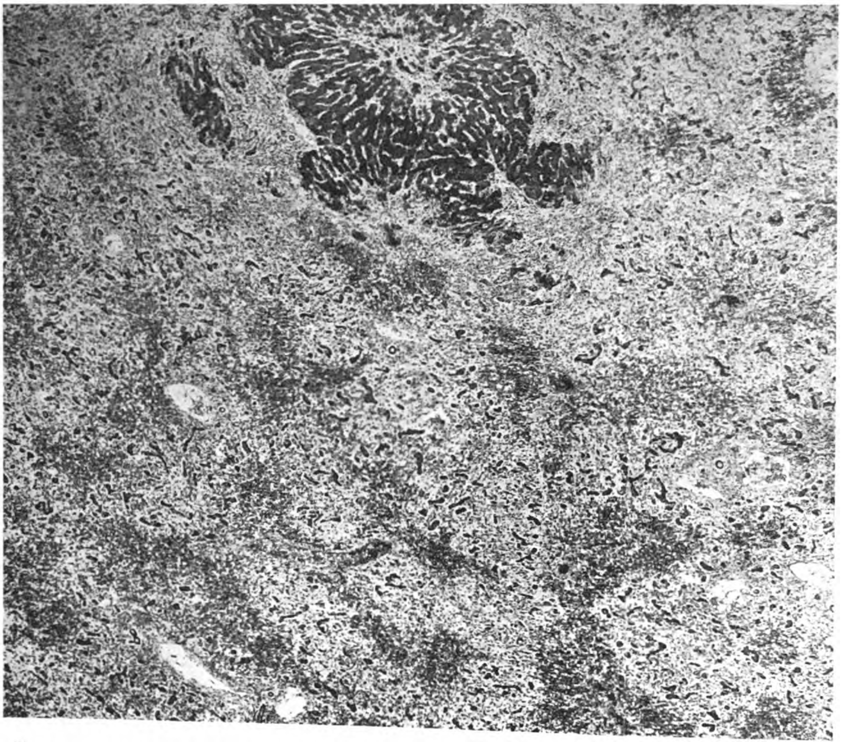


Fig. 5.—Late stage of toxic cirrhosis. Sclerosis of liver following extensive central necrosis and acute yellow atrophy. Lobular arrangement preserved but shrunken; bile ducts prominent.

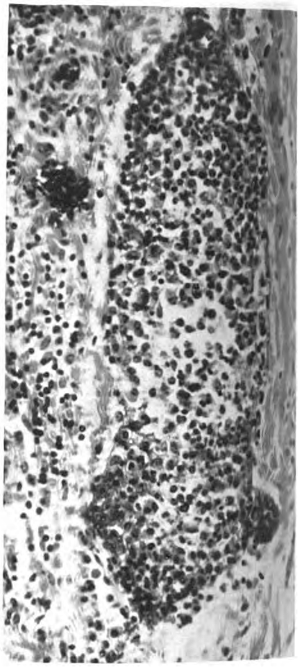


Fig. 6.—Early stage of infectious cirrhosis. Lymphatic in capsule of liver dilated and filled chiefly with endothelial leucocytes.

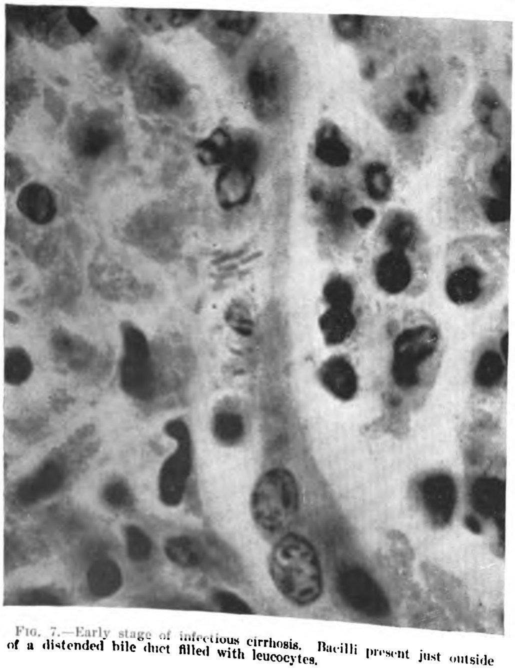


Fig. 7.—Early stage of infectious cirrhosis. Bacilli present just outside of a distended bile duct filled with leucocytes.

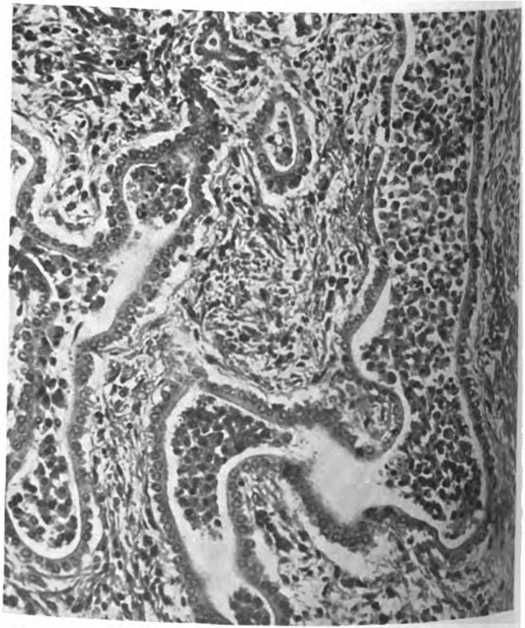


Fig. 8.—Early stage of infectious cirrhosis. Bile ducts dilated and filled with endothelial leucocytes.

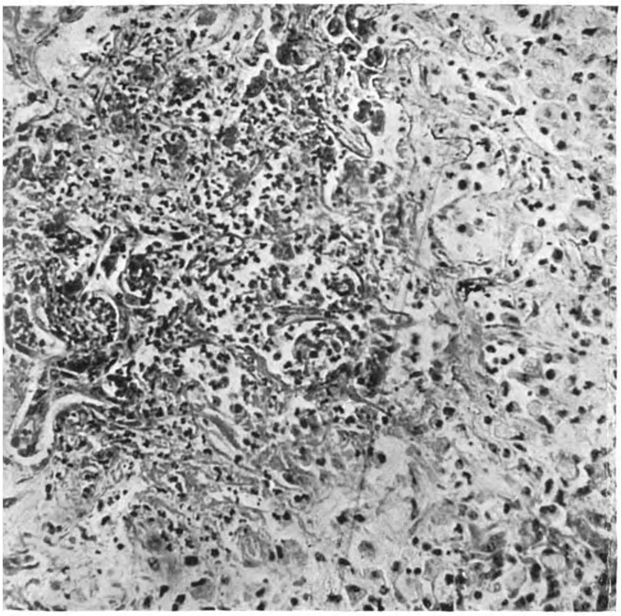


Fig. 9.—Bile stasis complicated by infection along bile ducts. Area of necrosis filtrated by polymorphonuclear leucocytes.

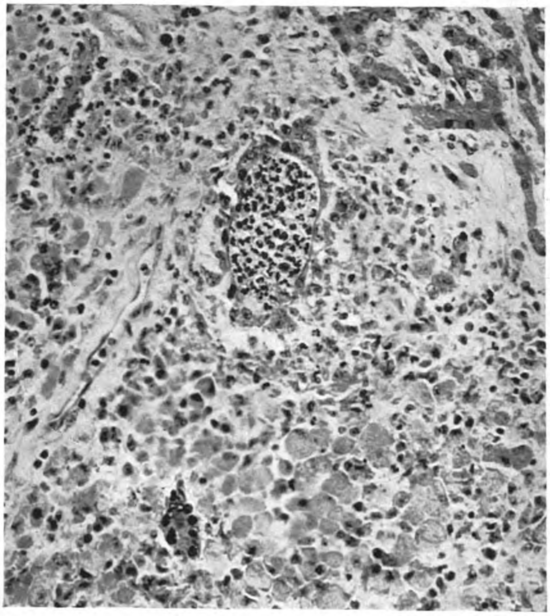
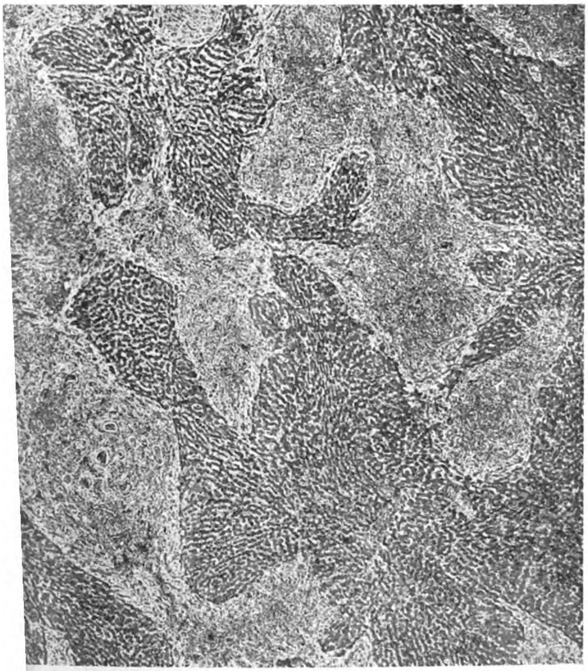


Fig. 10.—Early stage of infectious cirrhosis. Bile duct distended and filled with polymorphonuclear leucocytes: in adjoining area of softening chiefly endothelial leucocytes containing bile and fat.



11.—Early stage of infectious cirrhosis showing lesion situated around the vessels.

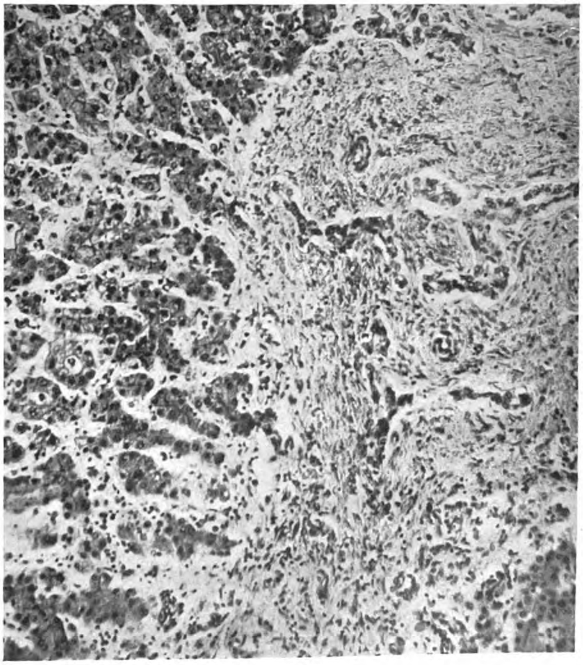


Fig. 12.—Late stage of infectious cirrhosis after repair has taken place.

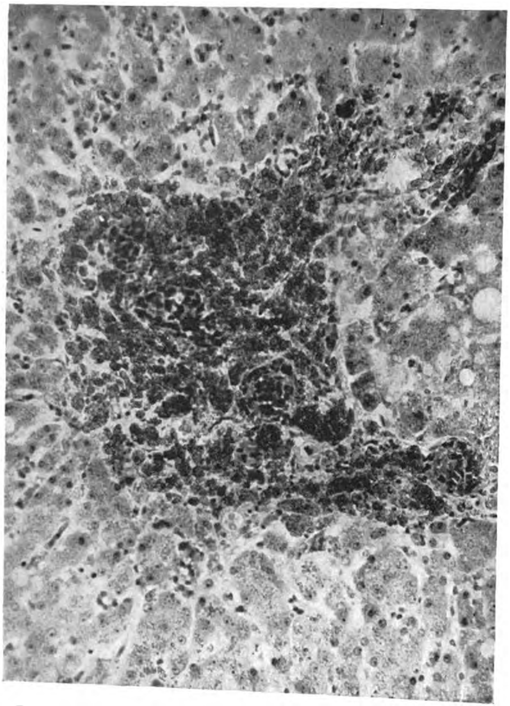


FIG. 13.—Pigment cirrhosis from a case of hæmochromatosis showing masses of endothelial leucocytes filled with blood pigment crowding the lymph spaces around the portal vessels and mechanically causing sclerosis.

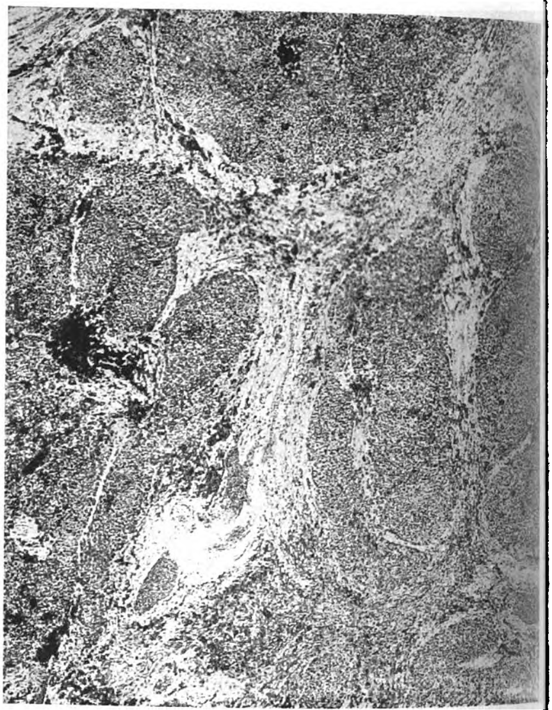


FIG. 14.—Pigment cirrhosis from a severer case of hæmochromatosis showing pigment and sclerosis.

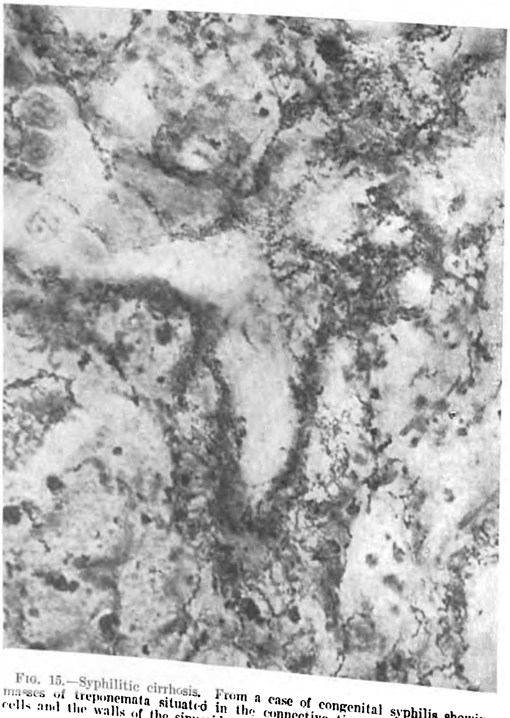


FIG. 15.—Syphilitic cirrhosis. From a case of congenital syphilis showing masses of treponemata situated in the connective tissue between the liver cells and the walls of the sinusoids.

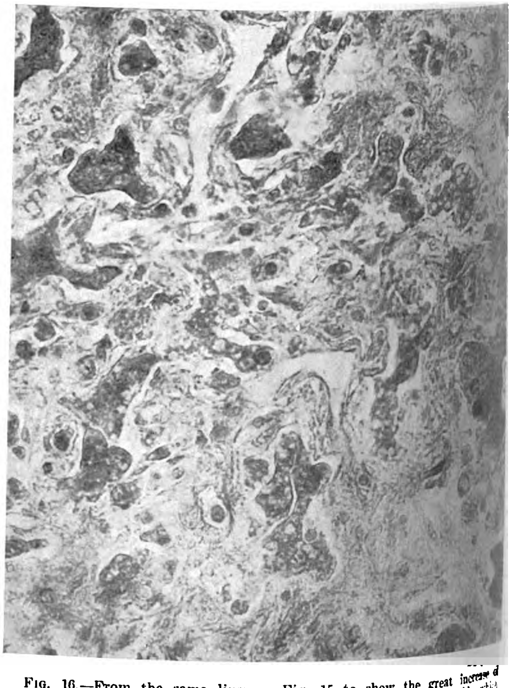
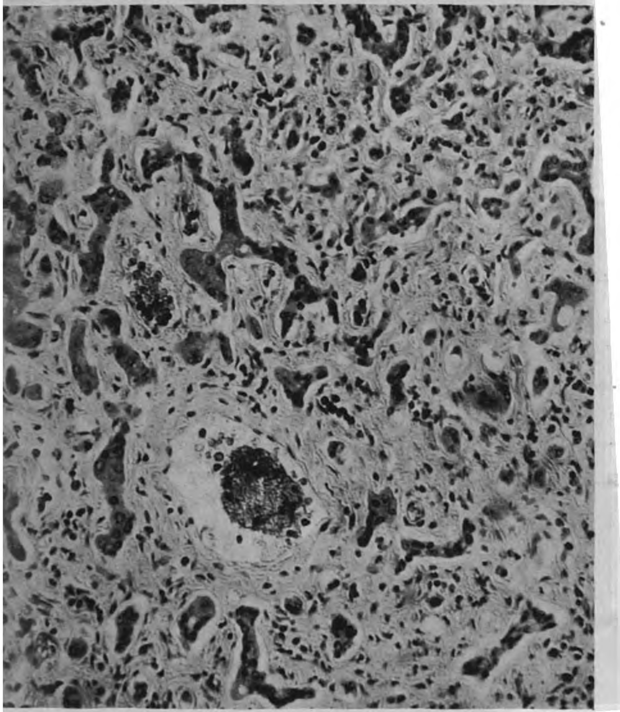


FIG. 16.—From the same liver as Fig. 15 to show the great increase of connective tissue between the liver cells and the walls of the sinusoids, which by contraction leads to compression and atrophy of the liver cells.



IG. 17.—Syphilitic cirrhosis. Liver from a case of acquired syphilis in the adult wing marked diffuse increase of the connective tissue around the liver cells sing compression and atrophy of them.

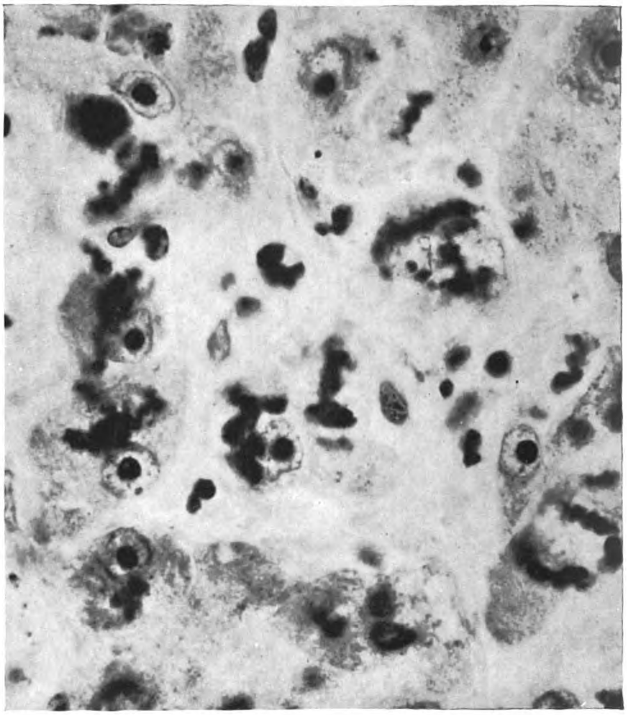
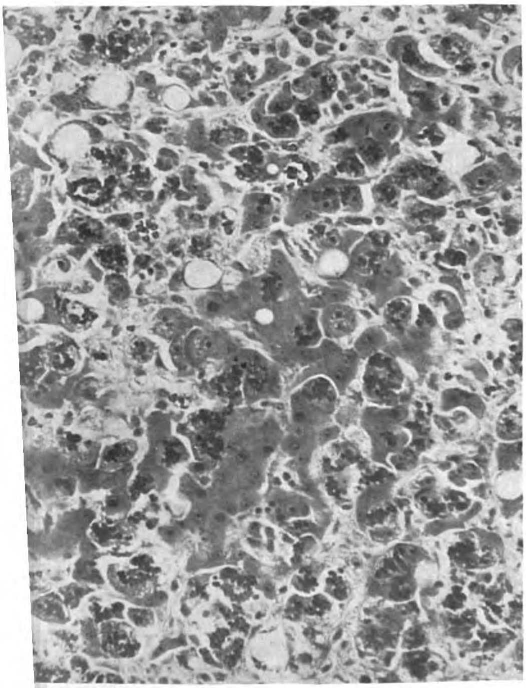


FIG. 18.—Alcoholic cirrhosis. Liver cells undergoing a peculiar hyaline degeneration before necrosis.



19.—Alcoholic cirrhosis showing numerous liver cells undergoing culiar form of hyaline degeneration.

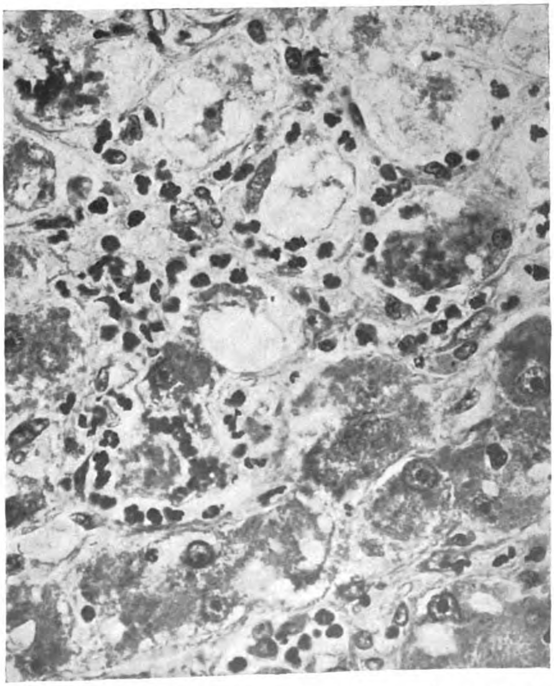


FIG. 20.—Alcoholic cirrhosis. The cells which have undergone necrosis following hyaline degeneration are being invaded by polymorphonuclear leucocytes.

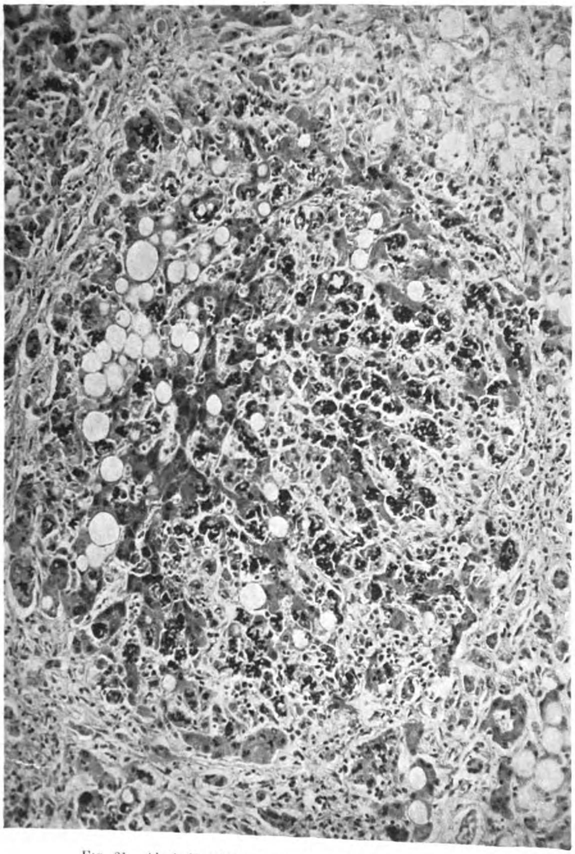


FIG. 21.—Alcoholic cirrhosis complicated with fatty infiltration.

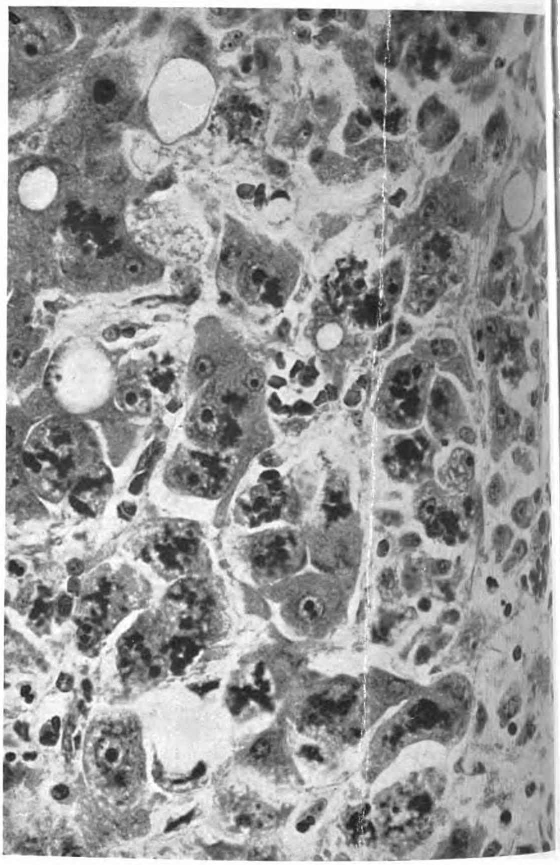


FIG. 22.—Alcoholic cirrhosis. The necrotic liver cells are being removed by the action of endothelial leucocytes.

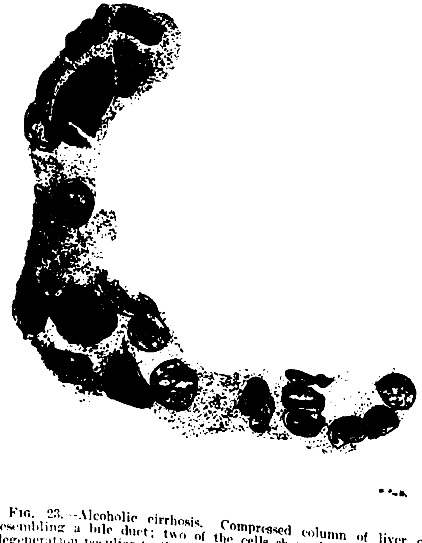


FIG. 23.—Alcoholic cirrhosis. Compressed column of liver cells resembling a bile duct; two of the cells show the type of hyaline degeneration peculiar to the liver cells in this type of cirrhosis.

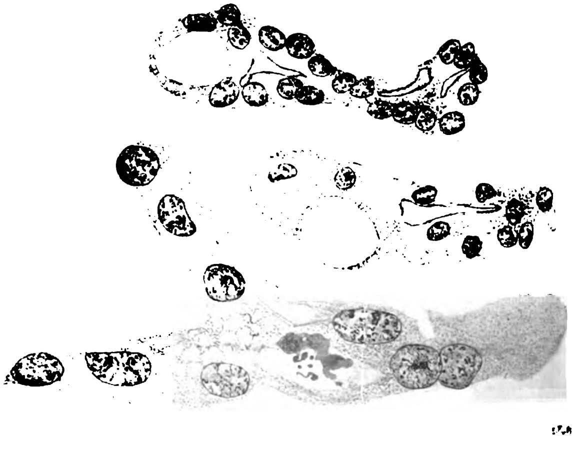


FIG. 24.—Alcoholic cirrhosis. Compressed columns of liver cells: one liver cell shows hyaline degeneration; two others contain fat vacuoles.

[illegible] possible to demonstrate vacuoles or hyaline material due to degeneration in ɔlasm, neither of which occurs in true bile duct n.

c cirrhosis the connective tissue thickens from con-but does not increase in amount because the fibro-e not been injured.

ɛctious cirrhosis the fibroblasts are destroyed along liver cells: hence there is active regeneration and duction of connective tissue.

hilitic infection of the liver the primary injury is ibroblasts; in consequence they proliferate (regene-en in excess: the contraction later of the collagen fibrils produced by them results in compression and more or less atrophy of the included liver cells.

In pigment and alcoholic cirrhosis the proliferation of the fibroblasts is apparently due to injury caused mechanically by cells of exudative origin stretching the connective tissue: the reaction is similar to that produced in the lungs and peribronchial lymph nodes by endothelial leucocytes filled with carbon packing themselves in the finer lymph spaces.

For the drawings I am indebted to Miss Etta R. Piotti; for the photomicrographs numbered 7, 13, and 18 to Dr. S. B. Wolbach; for the others to Mr. L. S. Brown, of the Massachusetts General Hospital.

HOID SPINE; WITH THE REPORT OF TWO ADDITIONAL CASES WITH BONY CHANGES IN THE VERTEBRÆ.

By Thomas McCrae, M. D., F. R. C. P.,

Associate Professor of Medicine and Clinical Therapeutics, the Johns Hopkins University.

sential character of the condition termed "typhoid ɪs been the subject of much controversy but the find-cent years have settled the question in favor of defi-ɪic changes—a spondylitis—as against a neurosis. In writer[1] reported two cases of typhoid spine in which rence of bony changes in the vertebræ was proved by rams. At that time, while the occurrence of bony n the form of kyphosis, etc., had been noted, there been any report of bony changes as shown by s. Since then several such cases have been reported e present paper two additional ones are described.

Typhoid fever in Nov., 1908; *tetany* (?); *recovery*; *Jan.* 8, 1909. *Symptoms of typhoid spine, March* 15, *ɔnd admission Apr.* 17, 1909. *Second attack* (*relapse?*) *fever Apr.* 26, 1909; *recovery.*

ent was a white male, aged 45 years, by occupation a His family history was negative and in his personal only illness was an attack of malaria in July, 1908. rmerly been a very heavy drinker but had taken no six months before admission. *First admission, Nov.* The present illness began with headache, weakness, nd general malaise. Apparently at times he had been lirious as there was a history of his wandering about n an aimless way. He was admitted on the sixth day ase. On admission the tongue was coated; some râles over both lungs; the heart was clear. There were erous rose spots on the chest and abdomen and the palpable. A blood culture gave typhoid bacilli, and the ion was positive on the day of admission and again on y. The patient showed signs of marked toxæmia, but ture of special interest was the occurrence of a condi-ike tetany during the course of the disease. There was ion of the toes and the hand was held in the position ay, this becoming much more marked when the cuff of essure apparatus was applied to the upper arm. The became normal on the 37th day of the attack and the discharged in good condition on Jan. 8, 1909. During ence there was no complaint of any pain or discom-ack and he felt well on leaving the hospital.

Second Admission—April 17, 1909.—After discharge from the hospital he did not return to work until Jan. 30, when he resumed his occupation in the blacksmith department of the works where he was employed. This involved some heavy lifting but he was quite sure that there had not been any injury or strain. He felt perfectly well until March 15, when he began to have pain in the lower part of the back; there was no other symptom. The onset was gradual and he was able to continue at work for one week but then had to give up on account of the severity of the pain. This was not constant but came on in paroxysms which lasted from 15 to 20 minutes. The patient commented on the effect on his general condition, remarking that the pain had made him "weak and discouraged." He emphasized the fact that the pain was much worse in the night than during the day and attributed his feeling so badly to loss of sleep rather than to the pain.

Examination.—The patient's general condition was good. The lungs were clear throughout except for a few râles at the bases. The heart was slightly increased in size, the impulse being feeble; the sounds were rather distant and the first had a slight murmurish quality at the apex. The pulse was of fair volume and the blood pressure 110 mm. Hg. The abdomen was negative; no rose spots were seen and the spleen was not felt. The abdomi[illegible] walls were soft; there was no contraction of the muscles. [illegible] hæmoglobin was 86 per cent, red cells 5,100,000 and [illegible] 5700 per cmm. When the patient stood up there [illegible] well marked scoliosis in the lumbar region and th[illegible] was held higher than the left. The usual lu[illegible] as almost obliterated. There was very little mov[illegible] lower spine when the patient bent forward and to the [illegible] ight and there was practically no movement in the lowe[illegible] ne when he bent backward. The spine showed very litt[illegible] movement below the tenth thoracic vertebra. On palpation there was some tenderness on both sides of the lumbar spine but no tenderness on pressure over the spinous processes of the vertebræ. The muscles on both sides were contracted and stood out prominently, this being more marked on the right side. The knee jerks and tendo Achillis reflexes were rather more active than normal and equal on the two sides, but the arm reflexes showed much the same increase. There was a normal response to plantar stimulation. At this time the patient had slight fever, about 100° F., which disappeared in the next three or four days. For the next five days the condition was practically the same. There was slight tenderness on pressure over the lower spines, especially about the fourth

---

ed. Sc., 1906, CXXXII, 878.

lumbar vertebra, and distinct tenderness on either side especially to the left of the fourth and fifth lumbar vertebræ. As long as the patient made no movement he was fairly comfortable but when asked to stand on his toes and come down forcibly on the heels he did this very slowly and carefully. When he walked the back was held very stiffly and when he tried to get out of bed he had great difficulty in doing it, the back being held rigidly and the patient bracing himself as much as possible by the arms. The abdominal muscles at times were held very rigidly. When the patient was flat in bed the lumbar lordosis seemed to be obliterated and there was marked rigidity of the muscles on both sides of the spine in this region. The *X-ray plate* on April 22d showed marked ossification of both lateral ligaments in the lumbar region and also a suggestion of this in the anterior ligament (Dr. Baetjer).

About this time for a period of two days, the patient was unable to void urine and he had to be catheterized. On April 23d the temperature rose to 100° F., and the next day to 103° F., which proved to be the beginning of a typical attack of typhoid fever. A blood culture on April 26 (the fourth day of the fever), yielded typhoid bacilli and the Widal reaction was also positive. On April 27, it was noted that the spleen was enlarged and palpable. No rose spots were made out. During the illness the patient suffered greatly from the pain in the back, at times this being extremely severe. His expression of apprehension when anyone came near the bed, fearing that they might touch it and so cause him pain, was always striking. He looked very haggard and ill, and remained absolutely motionless unless he had to move; this was done with great deliberation and care and there was no doubt of the severity of the pain. Examination showed no disturbance of sensation in the legs; ordinary sensation, pain and temperature sense all seemed normal. The attack of fever was not very severe; the patient did well and the temperature reached normal on May 8, the 16th day of the attack or relapse. The blood count showed a slight drop, as the hæmoglobin was 80 per cent, red cells 4,460,000 and the leucocytes 6800 per cmm. The leucocyte counts throughout were between 6000 and 7000. The urine showed a specific gravity usually between 1014 and 1028; there was no albumin or sugar. A positive diazo reaction was given once. The blood pressure was low, generally between 80 and 100 mm. Hg., averaging about 90 mm. Hg.

On May 20, a plaster cast was put on with the patient in a hammock. A second one was applied a week later and the patient was much more comfortable. At this time he complained very little of pain and got about without much difficulty. There was no evidence of any wasting in the legs more than is usual after an attack of typhoid fever. The leg reflexes were rather active but equal on the two sides and sensation seemed perfectly normal. The X-ray plate showed the same changes in the vertebræ as before. He was discharged in good condition on June 8.

On July 18, 1909, the patient was seen and found to have been improving slowly. He had not returned to his usual employment but had been doing a certain amount of light work which did not involve much exertion. He had been wearing a plaster jacket and stated that he suffered very little from pain in the back although he had felt weak. Two days before this examination he removed the plaster jacket and since then has had rather more pain. Examination of the back did not show any change in the spine but the muscles on the right side were still definitely more contracted than on the left. There was no kyphosis and no definite scoliosis. What pain the patient had was referred to the lumbar region but there was no tenderness on pressure over the spine. The reflexes in the legs were still much exaggerated. Four months later he was practically well.

Remarks.—One point of interest is the occurrence of a relapse or second attack between five and six months after the original attack. Whether this should be termed a relapse or a second attack is difficult to decide, for there is no period which can be set as a dividing line between a relapse and a second attack. The case here reported is much like one previously described by the writer,[2] in which the original attack began on June 2, the patient being convalescent in March when the symptoms of typhoid spine appeared. He was admitted to the hospital on July 4 of the same year for the spinal symptoms, and a week later the second attack (or relapse) of typhoid fever began. In both these cases there was an interval of months between the attacks, in which the symptoms of spondylitis appeared. One explanation of the cause of typhoid spondylitis is that there are local lesions in the bone in which typhoid bacilli are present. It is tempting to suggest that this focus may have been the source of the second infection in these cases. However, our knowledge of what determines relapses is not very satisfactory and it would be easier to regard the second febrile attack in these two cases as a second attack rather than as a relapse. Besides the retention of typhoid bacilli in the body after recovery from an attack of typhoid fever is so common (e. g. in the gall bladder) that we should not attach too much importance to such a source of reinfection.

CASE 2. *Typhoid Fever in June*, 1909; *intestinal hemorrhage; phlebitis; recovery; discharged Aug.* 14, 1909. *In October*, 1909, *neuritis of the right external popliteal nerve; spondylitis found*

The patient was a white male, aged 45, whose occupation was a worker in a factory in which he did a great deal of heavy lifting. The *first admission* (Medical No. 24248) was on June 14, 1909, when he came complaining of cough. There was no history of arthritis and he had not used alcohol. He had always been a hard worker and a heavy eater. His illness began eight days before admission when he received a severe wetting. For a day or two after this he felt dizzy and had some indefinite trouble in the head; this was much worse after he spent some hours working in a hot room. There was also some headache and indefinite pains about the chest. On examination the patient was a healthy looking man with a good color. The percussion note over the lungs was rather hyperresonant and there were a few râles heard on both sides of the chest; the heart was clear. The abdomen was natural; no rose spots were found and the spleen was not felt. Four days after admission the temperature fell to normal and then rose again, at one time reaching 105° F. Definite rose spots appeared and there was slight jaundice. On June 22, about the 16th day of the illness, the patient passed blood from the bowel, but the hemorrhage was not severe, and made no change in the patient's general condition. On June 21, the 15th day of the disease, the blood culture was positive, typhoid bacilli being obtained. The course was without any special features till he began to get up out of bed on August 8, when he complained of some pain in the right leg, both in the popliteal space and below the knee. The leg was somewhat swollen below the knee; the skin had a shiny appearance and was quite sensitive to the touch. There was definite swelling and the circumference of the right calf was 3 cm. greater than the left. This was regarded as a mild attack of phlebitis and subsided before discharge on August 14th.

For a time after leaving the hospital both legs were very weak, especially below the knees and the swelling and pain in the right leg returned after discharge. In from two to three weeks the weakness of the left leg had disappeared entirely but the right

---

[2] *Loc. cit.*

out six weeks that the pain and swelling in the right leg dis-
ppeared and the patient was able to walk about without any
ecial discomfort. During October the patient was seen several
mes in the out-patient department. His complaint was espec-
lly of dizziness and weakness, but he stated that he had not
ffered from any pain. He had chronic ear trouble for which he
d been treated some time before and the aurist considered that
is was possibly responsible for the dizziness. The patient had
ade several attempts to resume work but found that he had not
fficient strength and that when he went to do any heavy lifting
was apt to stagger. It was not possible to obtain the history
any special strain or injury during this time and no definite
dence of spondylitis could be found although the patient was
eatedly examined with this in mind. There had not been any
n in the back and it was difficult to test the movements of the
ne as on any attempt at bending the patient complained of
ziness and was afraid of falling. In the absence of any definite
nptoms suggesting spondylitis it was not thought necessary at
time to have an X-ray plate taken. During this time he
gained twenty pounds in weight and was a good deal stronger.
owards the end of October the patient began to complain of
ible in the right foot. He stated that at first there was numb-
over the upper part of the foot and especially in the great
later he had some difficulty in walking as he was unable to
erly lift the foot. On October 27, it was found that he had
e difficulty in walking and that the right foot dragged a little.
w days later he complained of a good deal of pain in the right
, and the gait was distinctly more affected. The knee jerks
present on both sides but the ankle jerk was decreased on
right. He had no power of movement in the right great toe
had difficulty in lifting the foot. In view of the condition he
admitted to the hospital November 9. (*Second admission*).
xamination the patient's general condition was excellent; the
and heart were clear throughout. The abdomen was nor-
and the spleen was not felt. On examination of the legs it
found that there was marked foot drop on the right side with
ed weakness of the extensors of the right foot. Voluntary
l flexion of the right foot was possible but the right great
ould not be flexed or extended except that slight flexion oc-
d when the other toes were moved. Passive movement of
eat toe was possible in any direction. The knee jerk on the
side was much more marked than on the left. Plantar re-
e was normal on the left side but could not be obtained on
ght side. There was no ankle or patellar clonus. The super-
veins of the right leg were definitely dilated but there was
ema of the feet or ankles, and well-marked pulsation was
t in the dorsalis pedis artery on both sides.

the dorsum of the right foot, from the ankle along the
margin, including the right great toe and extending to the
of the extensor digitorum longus, sensation to touch was
affected and the response to pain and temperature stimuli
ther inaccurate. Along the medial border there was an
hyperæsthesia; pain stimuli caused a marked contraction
rectus femoris, almost approaching a spasm. There was
phy of the calf muscles and there did not seem to be any
ce in the strength of the hamstring muscles of the two
he sensory disturbances cleared rapidly and disappeared by
ber 25. On electrical examination it was found that with
vanic current the affected nerve did not respond to stimuli;
scle itself responded to a strong current, the ccc. being
r than the acc. With the faradic current the nerve did
pond; the muscle responded sluggishly and less so than
cle on the other side.

X-ray plate by Dr. Baetjer showed a definite deposit of
the left side of the spine between the articulations of the
and V lumbar vertebræ, which practically obscured the articulations. The bone was deposited on the lateral ligaments and the anterior and posterior ligaments seemed free. There was no deposit on the right side.

During this time the patient's temperature was practically normal, and he was discharged much improved after being ten days in the hospital. The patient's condition improved steadily after this and in January, 1910, the signs in the right leg had practically disappeared. He complained that the right leg tired more quickly than the left; this may have been due as much to the effects of the phlebitis as to the paralysis. By the beginning of March the patient seemed perfectly well. He did not make any complaint of pain in the back and the movements of the spine seemed normal except for slight limitation in the lumbar region. He had returned to work and seemed able to do this without difficulty.

Remarks.—This case is unusual in several particulars. In the first place it shows that typhoid spondylitis may occur without any severe pain. The symptom of pain has been regarded as the most essential one in "typhoid spine" and it is very evident in this case that but for the radiogram the diagnosis of spondylitis could not have been made. In this event the condition in the popliteal nerve would have been regarded as a post-typhoid neuritis and the causal influence of the local process in the spine would not have been recognized. The involvement of the nerve root on the opposite side to that on which the deposit of bone occurred is seen not infrequently in cases of spondylitis.

The Nature of "Typhoid Spine."—Formerly the term was applied to a symptom picture regarded by many as being a neurosis in the majority of cases. That it may be a neurosis in some cases is quite possible but the increase in our knowledge of the organic changes which occur in "typhoid spine" speaks against this view. This is upheld by the fact that as the condition was studied more carefully an increasing number of cases have been reported with evidence of definite bony changes, supporting more and more strongly the view that it is a spondylitis. This is analogous to the change in our views regarding spondylitis generally. The work of recent years has shown that many of the cases formerly regarded as lumbago, "rheumatism," etc., are instances of spondylitis, probably associated with various organisms in different cases. The proportion of cases of "typhoid spine" with bony deformity or shown by the X-rays to have bony changes is comparatively large, in fact as large as could be expected. Spondylitis is of very varying degree in different cases and many of those which we see with other conditions—such as arthritis deformans when a spondylitis is part of a multiple arthritis—give no positive evidence of bony changes either by deformity or by the X-rays.

In 1907 Silver[3] collected 67 cases of typhoid spine of which 14 were rejected for various reasons, leaving 53 fairly definite cases. Among 51 of these in which the sex was stated only six were females. In making this collection Silver excluded those cases in which a neurosis seemed probable. Myers found in his study that kyphosis had been noticed in 36 per cent of the cases. It seems a fair inference that in a large number of cases with an actual spondylitis this need not proceed to the extent of causing external bony change. However, the number of cases with external bony deformity, considered with the number in which radiographs show bony changes, points to the probability that the symptoms are due to a definite process in the spine or its attachments. To decide this question as far as possible the various changes which suggest definite local changes may be considered.

---

[3] Typhoid Spine; a report of a case with radiographic evidence of structural change; analysis of the reported cases; complete bibliography." The Am. J. Orthop. Surg., 1908, V, p. 194. In the same volume is an article by Myers, "Typhoid Spine with special reference to the deformity." These are two interesting and comprehensive articles which should be read by all interested in the subject.

1. *Local swelling.*—This has been frequently noted and Silver found it reported in 14 (26 per cent) of his collected series. Redness has been present in a few cases, tenderness in many more, sometimes over the spine, sometimes over the adjacent muscles. Rigidity of the spine has been quite common and may be considered to be almost invariably present.

2. *Changes in the spine.*—Kyphosis was noted in 15 of his series by Silver and by Myers in 20 of 56 cases (36 per cent). The descriptions of this vary considerably but it is fair to say that some degree was present in one-third of the cases. Scoliosis was noted in some cases, in nearly all of which it disappeared after an interval. Alteration of the lumbar curve is not uncommon.

3. *Evidences of involvement of the nerve-roots.*—These while variable, still are suggestive of organic changes. Sensory disturbances are common and alterations in the reflexes occur in a large proportion. In some cases the symptoms evidently were due to changes inside the spinal canal causing pressure on the cord. In one of the cases previously reported by the writer there was marked atrophy of the muscles of one leg. The second case here reported is of special interest in this connection.

4. *Radiograms.*—These have shown definite evidence of bony changes in a sufficiently large number of cases to support strongly the view that organic changes are the rule in typhoid spine. It must be remembered that many cases of spondylitis do not show any definite bony changes. Brief mention of some of the findings may be made. In the two previously reported by the writer there were definite deposits of new bone in the lower spine. In Silver's case there was a slight curving of the spine to the left at the juncture of the first and second lumbar vertebræ in the first plate, which had disappeared when a second plate was taken. On the left side of the spine no line of separation between the bodies of the first and second vertebræ could be made out, the bone was denser than normal and there was a shadow between the transverse processes which represented a deposit of new bone. In Myers' case the skiagram showed "a synostosis between the second and third lumbar vertebræ with loss of height from disappearance of the intervertebral space." Halpenny[4] in 1909 analysed 72 cases from the literature among which there were ten cases with radiographic examination, in two of which no changes were found. Some additional cases have been reported in which definite changes were found. Carling and King[5] report a case in which the "spines of the eleventh and twelfth dorsal and first lumbar vertebræ were prominent." There was also a deviation of the column to the right. The X-ray plate "showed a very dense shadow over the bodies of the ninth, tenth and eleventh dorsal vertebræ, extending laterally beyond their limits and expanding from above downwards to a point an inch outside the articular processes on the right side and rather less on the left. The right edge was rectilinear and well defined; the left edge was irregular and not so well defined below." Three weeks later "the main mass of the shadow was less dense, whilst indications of a localisation to the costo-vertebral articulations could be made out." Wilson[6] reported a case in which there was thinning of the intervertebral discs with signs of necrosis in the vertebræ and many osteophytes around them. In connection with these reports it is interesting to note that relatively very few cases of typhoid spine have been reported from Great Britain. Another case is reported by Godder,[7] in which the "X-ray of the spine shows a diseased condition of the vertebræ at the level of the last dorsal and first lumbar." There is no other note as to the bony changes. In Swett's[8] case there was slight lumbar kyphosis and scoliosis. The X-ray plate "showed a disappearance of the disc between the fourth and fifth lumbar vertebræ, with evidence of new bone formation and the scoliosis beginning at this point." In a recent article Frick[9] reports three cases without mentioning an X-ray examination. He discusses the whole question at length and gives an excellent bibliography. One of his cases showed the curious rhythmical contractions of the abdominal muscles which were noted in one of our earlier cases. In Frick's patient the contractions were synchronous with the pulse. Potter[10] has reported a case in which the X-ray plate showed "a very definite lesion in the intervertebral disc between the tenth and eleventh dorsal vertebræ. The spacing between these vertebræ is reducd to about one-half the size it is between the others." There was an increase in the density of the lower part of the tenth and upper part of the eleventh dorsal vertebræ.

5. *Suppuration.*—The occurrence of suppuration is worthy of mention. It has been pointed out that if the condition is due to the local action of typhoid bacilli, suppuration might be commonly expected, as typhoid bone lesions in general show a marked tendency to pus formation. Yet one of the prominent features of typhoid spine is the absence of suppuration. In the report of the previous cases the writer suggested that it was exceedingly probable that instances of suppuration would be reported sometime and in this connection a case reported by Myers is of interest. A diagnosis of typhoid spine had been

---

[4] Typhoid Spine; with the report of a case. Surg., Gynec. and Obst., 1909, IX, 649.

[5] Lancet, 1910, I, 1136.

[6] Lancet, 1909, II, 1279.

[7] Bost. M. and S. J., 1910, CLXII, 711.

[8] Yale Med. J., 1909, XVI, 119.

[9] Interstate Med. J., 1910, XVII, 815.

[10] Med. Rec., 1910, LXXVIII, 1092.

had been on for weeks some odor was noticed and on removing the cast a granulating wound was found over and to the right of leventh and twelfth dorsal spines. The skiagram showed ostosis of the eleventh and twelfth dorsal vertebræ. Some ion arose as to whether the abscess had originated in the or was due to pressure of the jacket and cultures did not e the matter. While this case is suggestive it can hardly cepted as definitely proved to be an instance of suppura- associated with typhoid spondylitis. An instance reported uyot[11] is also not positive although very suggestive. This in a child who after an attack of what was regarded as id spine, had pain in the lumbo-sacral region. On in- n on both sides of the spinous processes, a large amount of vas found but no proof obtained of any bone lesion. Two later a focus of osteomyelitis in the left fibula was opened a few days later one in the right thumb. The patient re- ed without any deviation of the spine. However, this ot be regarded as a definite proved case.

rtain cases in which abscess formation occurred over the spine may suggest a possible source in the bone but it is ssary to remember that deep bedsores may extend down to one and suggest an origin from it. In fact the necrosis times involves the deeper tissues earlier than the skin. e absence of positive proof it is not wise to consider these amples of suppuration due primarily to processes originat- n the bones.

eatment.—As regards prevention it is important to re- ber the influence of trauma and we should warn the nts convalescent from typhoid fever to exercise care in en- g in any occupation which might throw strain on the . When the condition is established it is well to carry ctive treatment at once as by doing this we can probably the extension of the process in some cases and certainly the patient suffering. One form of treatment seems well a trial, the use of vaccines as in the prevention of id fever. It is to be hoped that this will be tried in the e. The dosage should be the same as that employed in the anti-typhoid vaccination. In treating the established condition two points have especially to be kept in mind, the relief of pain and the protection of the spine, which, as Myers points out, is often structurally weak. The pain is usually lessened by immobilization of the spine as any movement causes great suffering. To secure this some form of fixation is required. Myers favors the use of a brace, pointing out that in the application of a support it is important not to fatigue the patient or injure the spine. He also draws attention to the importance of avoiding anything which will compress the chest. If a jacket is applied this should be done with the patient in a recumbent position and not by the suspension method. Silver mentions the use of the plaster bed and also a gas-pipe frame. It seems important to carry out whatever is adopted as early as possible after the onset of the condition. By this we may shorten the duration of symptoms and perhaps limit the amount of spinal involvement. In the first case reported here the plaster jacket was exceedingly satisfactory and gave the patient great relief. In the first of the cases previously reported by the writer, the jacket failed to give any relief and increased the pain. In such cases or before some appliance can be applied the use of counter-irritation, especially the Paquelin cautery, may give relief. Large doses of sedatives often seem to be without effect on the pain and the quantity of morphia which can be given without any appreciable relief to the patient is remarkable. The fever, which is often present, sometimes diminishes as soon as fixation is carried out, if it be due to the spondylitis. In cases in which it is due to a relapse or a second attack of typhoid fever, one must be guided by the indications. It may be very difficult to carry out any systematic method of hydrotherapy and in such cases expectant treatment is the only resort.

Conclusions.—It may be regarded as established that "typhoid spine" is a spondylitis or perispondylitis with definite local changes which may lead to the formation of new bone and so result in more or less fixation of the spine. Judging from spondylitis generally, this permanent change is less likely to occur if the proper treatment is instituted early. Many cases of spondylitis clear without permanent changes.

---

z. hebd. d. sc. méd. de Bordeaux. 1906, XXVII, 9.

ERYTHEMA MULTIFORME IRIS DURING THE COURSE OF TYPHOID FEVER.

By H. P. Parker, M. D.,
Professor of Medicine in Howard University, Washington, D. C.

AND

H. H. Hazen, M. D.,
Clinical Professor of Dermatology in Howard University, Washington, D. C.

e the time of Willan, the various forms of erythema, te exanthemata, and inflammations of the skin were l together, as was exemplified by the writings of Plenck 1783. In 1808 Robert Willan (2) separated the a multiforme group from the acute exanthemata on hand, and from the inflammations due to external irritants on the other. It is interesting to note that in the same volume under the heading of purpura he described what was probably a case of erythema multiforme associated with vomiting, abdominal pain, arthritic pains, and an anasarcous swelling.

In 1835 Rayer (3) cited several cases of Bonnet's to show that the various forms of erythema might coexist, and in 1854 Hebra (4) showed that the several types of erythema multiforme were forms of one and the same malady. In 1876 Lewin (5) stated that some cases had a fatal termination, and ran the course of an acute infection, though he considered the cutaneous symptoms to be reflex in origin and frequently due to urethral irritation.

In 1895 Osler (6) first published a series of cases in which urticaria, angioneurotic œdema, erythema multiforme and purpura occurred successively or together in the same individual, and in association with a large array of visceral manifestations. Osler supplemented this article by two others, and many other writers, notably Mackenzie (7), Chenoweth (8), Neisser (9), Bulkley (10), Galloway (11) and Sachs (12) have extended this work until we know that the skin lesions of the erythema multiforme symptom complex include urticaria, angioneurotic œdema, purpura, erythema multiforme and nodosum, and if we are to believe Galloway and MacLeod (13) certain cases of lupus erythematosus as well. In the minds of the writers it is questionable whether certain other diseases, notably erythema scarlatinoides and dermatitis herpetiformis should not be included.

Visceral Symptoms.—Any one of the following visceral symptoms may occur; sometimes there are no manifest skin lesions.

Acute tonsillitis, otitis media, laryngitis, phlyctenular conjunctivitis.

Ulceration of the lips and tongue.

Temporary delirium, aphasia, hemiplegia, meningitis.

Gastro-intestinal crises with colic, vomiting, and diarrhœa.

Appendicitis, degeneration of the liver, jaundice.

Enlargement of the liver and spleen.

Bronchitis, pneumonia, pleurisy with effusion.

Endocarditis and pericarditis, anemia.

Hemorrhages from the nose, intestines, stomach, lungs, and kidneys.

Arthritis and infiltration of the synovial sheaths and periarticular structures.

Nephritis and ulceration of the cervix uteri.

Fever, usually irregular and of short duration, but often high.

Etiology.—As regards etiology there have been many theories. In 1835 Gibert (14) wrote that some cases of erythema were symptomatic due to derangements of the internal viscera. In 1850 Bulkley (15) stated that it was especially associated with digestive disturbances and gout. In 1864 Köbner (16) said that it was an angioneurosis due to vasomotor disturbances. In 1876 Lewin mentioned reflex causes, frequently urethral. Chaisse (17), Legendre (18), and Galloway (19) thought that it was due to autointoxication. Finger (20) thought that the local effect of bacteria upon the tissues caused some cases. Many writers, as Singer (21) and Howard (22) found bacteria in the blood, but in the majority of cases the technique of the blood-culture was not above criticism, and Koch's postulates were never fulfilled. As Corlett's (23) case well illustrates some at least were undoubtedly due to streptococcus infections.

Erythema multiforme is also known to occur with such definite infections as typhoid fever, diphtheria, syphilis, gonorrhœa, tuberculosis, cholera, pneumonia, leprosy, malaria, trypanosomiasis, and with suppurative processes in any portion of the body, and may also occur with nephritis and diabetes. Various drugs and antitoxins, and some articles of food also give erythematous, papular, and bullous eruptions that have the same clinical picture as the erythema multiforme group.

Erythema multiforme is frequently spoken of as occurring in typhoid, but we have been able to find only two instances where the eruption occurred during the course of the fever, the cases of Lauffer (24) and Goldstein (25), while Peter's (26) case developed the lesions during his convalescence. Many writers, of whom DaCosta (27), and Hutinel and de Gimard (28) may be taken as fair samples, speak of measley and of scarlatinoid eruptions. Schamberg's (29) article gives an excellent summary of these conditions. In a study of 1500 cases of typhoid at the Johns Hopkins Hospital McCrae (30) notes erythema as occurring 15 times, urticaria twice, purpura 35 times and a pemphigoid eruption once. Thus it will be seen that true cases of erythema multiforme in the course of typhoid are very few.

J. B., a school boy, 14 years of age, a mulatto, was admitted to Freedmen's Hospital on November 5, 1909, complaining of a burning feeling in his eyes, severe headache, great weakness, bleeding from his nose, and a slight cough.

His family history was unimportant, his father, mother and two brothers having died of unknown causes, and his remaining brothers and sisters being in good health.

The patient had suffered from measles, mumps, malaria, and rheumatism, but from no other complaints, though he had had some vague indigestion, and some abdominal pain at night. He was accustomed to drink coffee and a little beer and whiskey, but otherwise his habits were good.

The present illness began two days before admission with a severe headache, which disappeared shortly to be replaced by a burning sensation about his eyes. He was so weak that he had to take to his bed at once. On the following day he had a severe chill, and in the evening nose-bleed. There was some slight cough.

On admission to the hospital the following notes were made: "The patient is a well-built, well-nourished boy; the facial expression is dull and heavy; the pupils are equal and react to light and accommodation. The tongue is covered with a heavy fur; the pulse is 108 to the minute, regular in force and rythm, of good volume and tension. The chest is well formed and symmetrical; the breathing costo-abdominal in type, 28 to the minute. On percussion and auscultation both lungs are clear throughout. The heart is not enlarged to either the right or the left. The heart sounds are clear and forcible. The abdomen is not distended, it is everywhere soft and tympanitic, the liver is not enlarged, but the edge of the spleen is felt two fingers' breadth below the costal margin. The knee jerks are present."

On admission the temperature was 103° F., and during the illness ran between 100.8° and 103.8° F., the pulse from 80 to 115, and the respirations from 25 to 30. Typhoid was suspected because of the history and initial symptoms, the continued high fever, and the facies. The patient was given an initial purge, and was put on six ounces of milk every four hours, alternating with albumin every four hours. An ice cap was put to the head u he was sponged every three hours when the temperature rose 102.5° F., or higher. An enema was given every second day. x ounces of water were given every two hours. Typhoid isola- n was carried out.

Two days after admission the following note was made: "The tient shows over the back of his right hand and extensor sur- ces of forearms a number of roughly circular, bluish patches out ½ cm. in diameter. Careful examination shows no rash on y part of the body with the exception of a few small rose- lored patches on abdomen and lower chest that disappear on essure." Later in the day the following special note on the skin ndition was made: "On the hands and forearms, both sur- ces, extending half way to the elbow, the fingers, the dorsal rfaces of the feet and the shins there are two varieties of ions, one of which is macular, ill-defined and varying in size om ½ to 3 cm. in diameter. The other lesion is distinctly an- lar, from ½ to 2 cm. in diameter, the center is red and the riphery is whitish. The edge is very well defined. On the tensor surfaces of both forearms there are scattered areas or ots that are free from pigment but having a hyperpigmented eola. The proximal finger joints seem slightly swollen, and are ight red in color, the general appearance being similar to the ythematous areas on the arms and legs." It was later found at the patient had suffered every spring for the last four years om an eruption that he described as being similar to the pres- t one save that the lesions became vesicular and burst, leaving ese white scars.

The urine had a specific gravity of 1026, and showed a trace of oumin but no casts nor red blood cells. The leucocytes num- red 4400, and a differential count of 500 cells gave:

Polymorphonuclears	66.6%
Eosinophiles	0.4%
Large mononuclears	1.0%
Small mononuclears	29.6%
Transitionals	2.4%

No mastcells or myelocytes.

The Gruber-Widal reaction, 1 to 50 for one hour, was negative. e blood pressure was 110.

On the 9th, two days after the last note, the carpo-phalangeal nts of both hands were red and swollen, and there were a few dish macules on the proximal phalanges: the annular lesions l persisted on the forearms and backs of the hands and on the

n the 19th there remained only a few annular lesions on both ds and feet. The temperature had now been normal for five s. He left the hospital on the 30th, with the same annular ons still persisting. Blood cultures and cultures taken from annular lesions were alike sterile. A Widal reaction, tried before he left, was noted as suggestive.

wing to the short duration of the fever, the absence of the al reaction, and the marked cutaneous symptoms it was tionable whether the patient was suffering from typhoid r complicated by erythema multiforme, or from one of the re forms of erythema with enlargement of the spleen, joint ptoms and continued high fever. In favor of typhoid were ontinued high fever, the mental dulness, the coated tongue, the low leucocyte count. Against typhoid spoke the abrupt t, and the short duration of the fever, the absence of the l reaction and the negative blood culture, although the lat- as taken rather late. The other symptoms and physical , including the differential count, could have occurred with r disease. A definite diagnosis was not made.

December 6, one week after his discharge, the patient was admitted to the hospital. His temperature was 103.6° F., 110, and respiration 30. On the 7th the following note was "The patient looks dull and heavy, he complains of headache and pain in his eyes, there is slight discharge from the nose; the patient is not disposed to look at the light. The upper lip is somewhat swollen. The tongue is furred and there is injection of the throat. The chest is negative with the exception of numerous sonorous râles heard during inspiration; these clear up quickly after coughing and are probably transmitted from the larger tubes. The heart sounds are clear. The spleen is easily palpable. There is a marked redness of the palms of the hands and of the heels. A few small rose-colored papules are visible over the various portions of the body. Wherever the patient makes pressure with any part of the body there is a marked erythema. The patient is coughing, and spitting up grayish, frothy, mucopurulent material."

The blood coagulation time, taken by Wright's tubes, was six minutes.

On the 8th the temperature was 104.8° F., pulse 110, and respiration 33. The Widal reaction at one to fifty for one hour was suggestive. A blood culture was taken and an organism found whose cultural characteristics agreed with those of the typhoid bacillus, and which was definitely agglutinated by the serum from a known case of typhoid fever. This made the diagnosis of typhoid fever certain.

On the 10th the leucocyte count was 5700, the red blood cells 4,104,000 and the hæmoglobin 62%. A differential count of 500 cells gave the following results:

Polymorphonuclears	65.2%
Eosinophiles	0.6%
Large mononuclears	.6%
Small mononuclears	25.8%
Transitionals	3.4%
Mastcells	0.0%
Myelocytes	0.4%

The urine showed a large amount of albumin; no casts or red blood cells were noted.

The course of this attack was much more severe, the temperature running as high as 105° F. The treatment was the same as during the first attack with the addition of a mild expectorant for the cough. On the 9th it was noted that the patient was having bloody expectoration. On the 18th he had a rather free epistaxis in the morning and also coughed up a considerable amount of blood, which might of course have come from the nose. On percussion the lungs were clear throughout, but on auscultation there were numerous sibilant râles at the bases, both front and back. Over the chest, abdomen and back there were some pinkish macules about 1 mm. in diameter, and a few other papules that resembled acne lesions. There were no new lesions of erythema multiforme, but the old annular lesions still persisted.

On the 22d of December it was noted that the patient had had a sudden rise of temperature, the temperature previously having fallen almost to normal. Examination showed dulness in the lower right axilla, and impairment of expansion over the same area. Over the right base in front, and over the whole back there were numerous sibilant râles at the end of inspiration. There was no alteration of the breath sounds. These physical signs were similar to those usually found in pneumonia accompanying typhoid.

On the following day the temperature again dropped, and after the 29th there was no fever. Three weeks later the patient was discharged. He still had the annular lesions on the hands and feet, but they were now fading. The same annular lesions persisted from the 7th of November to the 22d of January, 1910, an unusually long time for the annular lesions of erythema multiforme.

It is certain that the patient had typhoid during his second stay in the hospital, and practically certain that he also was suffering from the same disease during his first admission. During the height of his first attack he had the following symptoms characteristic of the erythemas: annular and macular skin lesions, and swelling and redness of the carpo-phalangeal joints. During the height of his relapse he suffered from œdema of the upper lip (giant urticaria), erythema at points of pressure, and hemoptysis. The fact that these lesions occurred only when the infection was young and active would seem to indicate that the typhoid toxemia was responsible for them.

REFERENCES.

1. Plenck: "Doctrina de morbis cutaneis," 1780.
2. Willan: "On Cutaneous Diseases," 1808.
3. Rayer: "Traité théorique et pratique des maladies de la peau," 1826-7, I, 136, 265.
4. Hebra: "Diseases of the Skin" (New Sydenham Society, 1866-80, I, 285.
5. Lewin: Berl. klin. Wchnschr., 1876, XIII, 321.
6. Osler: Am. J. Med. Sc., 1895, CX, 629, 1904, CXXVII, 1; Brit. J. Derm., 1900, XII, 227.
7. Mackenzie: Brit. J. Derm. 1896, VIII, 116.
8. Chenoweth: Med. News, 1905, LXXXVI, 390.
9. Neisser and Jadassohn: Krankheiten der Haut, Handb. der prakt. Med., Stuttgart, 1901.
10. Bulkley: "Skin Diseases and Internal Disorders," New York, 1882, 106.
11. Galloway: Brit. J. Derm., 1903, XV, 235.
12. Sachs: Arch. f. Derm. u. Syphil., 1909, XCVIII, 35.
13. Galloway and MacLeod: Brit. J. Derm., 1903, XV, 81; 1905, XX, 65.
14. Gibert: "Maladies spéciales de la peau," 1834, 89.
15. Bulkley: "Cazanave on the Skin," New York, 1852, 32, (footnote).
16. Köbner: "Klinische und Experimentale Mittheilung," 1864.
17. Chaisse: Quoted by Elliott, "Morrow's System," New York, 1894, vol. III, 114.
18. Legendre: Bull. et mém. Soc. méd. d. hôp. de Par., 1893, X 3d series, 216, 760.
19. Galloway: *Loc. cit.*
20. Finger: Arch. f. Derm. u. Syphil., 1893, XXV, 765.
21. Singer: Wien. klin. Wchnschr., 1897, X, 841.
22. Howard: J. Exper. Med., 1899, IV, 149.
23. Corlett: J. Cut. Dis., 1908, XXVI, 7.
24. Lauffer: Arch. f. Derm. u. Syphil., 1890, XXII, 379.
25. Goldstein: Internat. klin. Rundschau, Wien, 1890, IV, 1643.
26. Peter: Semaine méd., 1891, II, 281.
27. DaCosta: Am. J. Med. Sc., 1899, CXVIII, 1.
28. Hutinel et de Gimard: Méd. Mod., Paris, 1890, I, 88, 101, 124.
29. Schamberg: "Diseases of the Skin and Eruptive Fevers," Phila., 1907, 500.
30. McCrae: "Osler's Modern Medicine," Phila., 1907, Vol. II, 117.

ACUTE TUBERCULOUS ENDAORTITIS.*

By Paul G. Woolley, M. D.,

Dean and Professor of Pathology, College of Medicine, University of Cincinnati, Cincinnati, Ohio.

The present consensus of opinion is to the effect that tubercle bacilli cannot, except in the rarest instances, be observed in the circulating blood. Yet we know that they must be present there and often in large numbers. We have built up our ideas of the production of miliary tuberculosis upon the assumption that the organisms that cause the disease are distributed by the blood, to which they gain access in three ways; by rupture of a tuberculous focus in one or another organ into a blood vessel; by the invasion of the walls of blood vessels, especially veins, by the tuberculous process, with the production of a tuberculous lesion in the intima of the vessel from which bacilli are distributed; and by the involvement of the thoracic duct in a tuberculous process, from foci in which tubercle bacilli gain access to the venous blood.

Vascular involvement is frequent, and it is probable that a search in every case of miliary tuberculosis will be rewarded by finding a focus of extension, most frequently in the smaller pulmonary veins, or thoracic duct, less frequently in the renal or pulmonary arteries, aorta, or the vessels of one or another organ of the body.

Invasion *per extensionem* is the rule in small vessels. It is not so common in large ones, nor indeed is vascular involvement of any sort. This invasive process is the one that usually accounts for the production of a generalized tuberculosis. It is the process by which the bacilli gain entrance to the blood stream, whence they are distributed. But there is a second process by which the secondary vascular lesions are produced. It may be assumed to occur generally as the result of thrombosis of, or endothelial phagocytosis in the capillaries of the tissues. As a result of either the vessel wall is involved from the side of the intima. This invasion from the lumen is frequent in small vessels but is infrequent in large ones for obvious reasons. It is least common in the aorta.

A review of the literature on tuberculosis reveals the fact that aortic lesions may be of the invasive or of the metastatic type, and that both are rare. The metastatic lesions may be acute or chronic in character.

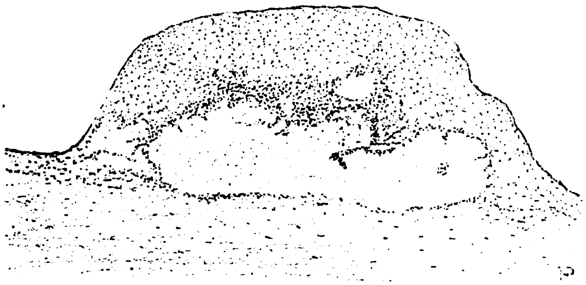
In the cases of Dittrich and Kamen the aorta was involved from adherent tuberculous bronchial glands, and this was followed by acute miliary tuberculosis and rupture of the aorta (Kamen). In Buttermilch's case the aortic involvement was secondary to a vertebral tuberculosis.

Schmorl mentions two cases of acute miliary tuberculosis which he conceives as being the result of the perforation of a tuberculous lymph gland or of a pulmonary cavern into the aorta.

Examples of tuberculous aortitis by extension are the cases of Dittrich, Kamen, Schmorl, Hanau and Sigg, and Buttermilch. In the case of Hanau and Sigg an aneurism ruptured

---

* Read before the Cincinnati Society of Medical Research, October 6, 1910.



T.B Gorta 1912

Fig. 1.

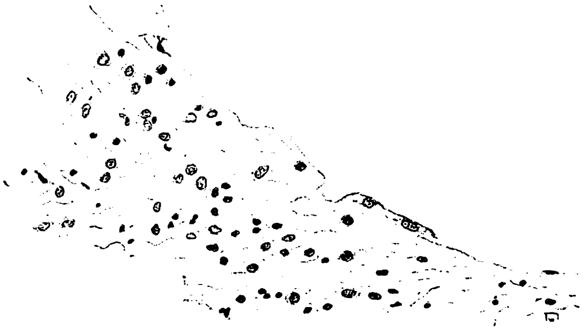


Fig. 2.

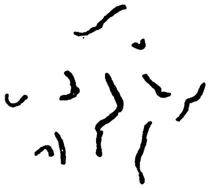


Fig. 3.

[redacted]. It is entirely probable that the rta was weakened, its walls infiltrated and an aneurism ısed thereby, after which rupture occured, for the edges of torn wall of the aneurismal sac showed tuberculous vege- ions.

The chronic type of tuberculous endaortitis is illustrated the cases of Forssner, Benda, Aschoff, Longcope, Schmorl, ylord, Simnitsky and Luksch.

In this series there has been, with few exceptions, a more or s severe arteritis or arteriosclerosis in association with the perculous changes, a coincidence that has lead to the as- nption that the specific lesions have been the result of in- ion of parietal thrombi by tubercle bacilli. In them the ocess has apparently shown no tendency to advance along intima, so that the lesions have increased into the lumen ducing either flattened nodules or, more commonly, poly- d growths. In all the cases reported by Benda the lesions re polypoid. In two cases they were situated upon areas sclerosis, in a third upon an atheromatous ulcer. In ksch's case the lesions in the aorta, anonyma, and left sub- vian were upon an endarteritic basis. In Forssner's case re was no arteriosclerotic change, but it is possible that in s the lesion was primary in the media resulting from a mary involvement of one of the vasa vasorum. The in- al tubercle measured 4 x 1 cm. Stroebes' case was one of hild in which there was a polypoid growth 7 mm. high and mm. thick, with no arteriosclerosis. Aschoff's case showed reme arteriosclerosis and a tuberculous mass the size of a n near the origin of the Ductus Botalli. The lesion de- ibed by Longcope was a polyp 3 cm. long, which was found the descending aorta of a child suffering from tuberculous disease. The report of Simnitsky, to which I have not had ess, save through Forssner's paper, concerned itself with a of chronic pulmonary and intestinal tuberculosis, and no iary tuberculosis. The aortic lesion was in one of the ises of Valsalva.

n all of Schmorl's five cases there was arteriosclerosis, and ıll the cases the tuberculous polypi were situated upon romatous ulcers.

ccordingly it appears that in this chronic group arterio- osis is more frequently present than is natural in tuber- sis, a disease in which the arterial tree is not as a rule rely affected, and it is therefore quite possible that the eption that the aortic lesions are the result of infection ural thrombi is correct in the majority of cases. Ten of teen of the reported cases showed the presence of arterio- osis. In two cases I have not been able to find a descrip- of the general aortic condition (Gaylord and Simnitsky) n two the patients were young individuals (Longcope and be). In this enumeration Forssner's case is excepted it is possibly in a class by itself.

e series of acute tuberculous endaortitis include the cases archand, Huber, Schuchardt, Hanot, Hanot and Levi, tsky, Blumer, Flexner and the one to be reported in aper. In all of these miliary tubercles were present in tima of the aorta.

The cases of Marchand and Huber were merely mentioned by Weigert who described them as showing the most exquisite structure, "giant cells, caseated center, etc." Schuchardt reported minute lesions situated near the junction of the thoracic and abdominal aorta. There was very little arteriosclerosis. I have been unable to find the report of the cases of Hanot and Simnitsky. That of Hanot and Levy was one in which a tubercle was found in the superior portion of the thoracic aorta. The tubercle discovered by Flexner was situated about 2.5 cm. below the left subclavian artery, and measured 2.5 x 1 mm. in diameter. The aorta was not sclerotic. Flexner believed that this tubercle was secondary to an infective thrombus in the pulmonary artery.

In all of the cases, of either acute or chronic type, the lesions have been described as containing large numbers of tubercle bacilli, a fact that has an important bearing upon the manner of the production of the general miliary tuberculosis that has been present in all except Simnitsky's first case, for many writers believe that the general lesions are the result of the escape of bacilli from the aortic lesions. It would seem reasonable, however, to limit the production of secondary general disease to the chronic cases, for in the acute ones the aortic lesions seem rather to be a part than the cause of it.

The case that I wish to report falls in the category of acute tuberculous endaortitides.

Case 152173.—The patient, a man of 59 years, and a laborer, was admitted to the Cincinnati Hospital on November 11, 1909, complaining of "bladder trouble." In August, 1909, he had been admitted to a hospital for cystitis, which was improved by treatment with urotropin and irrigations. He had suffered with "bladder trouble" for some two years previously, that is to say, he had had pain on micturition, a symptom which was not constant, but which occurred in exacerbations, at the onset of each of which he passed some blood. At the time of his last admission he gave no evidence of pulmonary or cardio-vascular disease, except a slight roughening of the breath sounds during expiration. There was no splenic or hepatic enlargement. He suffered with involuntary urination accompanied by pain. The urine was dark red and contained blood clots.

A week after admission he had a convulsion at 9 p. m., accompanied by a rise of temperature to 102° F., and complained of pain radiating from the bladder to the renal region. There was pain and tenderness in left lumbar region. Subsequently the temperature showed an evening rise. Blood examinations showed a leucopenia, the counts varying from 4400 to 7800. A cystoscopic examination showed that there was a severe cystitis present. The capacity of the bladder was but 90 cc. A diagnosis of "cystitis, probably tuberculous, secondary to tuberculosis of kidney," was made. On December 10, complaint was made of abdominal pain, and on December 12 death occurred. The post mortem was made three hours after death.

Briefly stated the result of the autopsy was that a generalized acute miliary tuberculosis involving the lungs, spleen, liver, peribronchial and mesenteric lymph glands, kidneys, adrenals, pancreas and aorta was found. The bladder and kidneys showed both chronic and acute tuberculous changes.

In the thoracic part of the aorta there were a few fatty streaks, and at the beginning of the descending arch there was one calcified plaque. The abdominal aorta showed an almost completely healthy appearance except at a point 10-15 cm. above the bifurcation, at which point were two small raised areas on the intima that had the appearance of recent vegetations and which measured about a millimeter in diameter. There was no tuberculous focus in the vicinity of the aorta in the neighborhood of these nodules.

Microscopic examination of the vegetation-like nodules in the aorta showed that they were really intimal tubercles, composed of epithelioid and small round cells, a partial endothelial covering, and a central area of caseation. In them were large numbers of acid fast rods of typical and atypical form, but no giant cells. Beneath these tubercles the media and adventitia were apparently normal, except immediately in the base of the tubercles where there was evidence of a minimal degree of degeneration in the adjacent part of the media.

In the lesions I have studied the bacilli were more numerous in the peripheral parts, and several were observed in the immediate vicinity of the lumen of the vessel. It is possible that some had entered the blood stream, but not in sufficient numbers to cause the appearance of the myriad lesions in other organs.

A further observation of some interest relates to the form of the bacilli in the intimal tubercles. In the cases in the literature, I have not been able to find reference to any other then presumably typical rods. In my case, however, many of the rods were far from typical. Quite a large proportion were of irregular form, and while no actually branching ones could be found, some of them showed bizarre figures that suggested branching.

I believe that in this case the generalized miliary tuberculosis, of which the aortic lesions were a part, was the result of distribution of the organism from the older foci in the kidney, and that it did not result from distribution of tubercle bacilli from the aortic tubercles. The case therefore belongs logically with the group of acute hematogenous aortitides.

It is difficult to account for the lodgment of the organism in these acute cases unless one presupposes at least an incipient degeneration of the cells of the intima, and the formation of ever-so little fibrin in which the bacilli may become entangled. It is very possible that in all cases of general infection and toxemia, more damage is done to the endothelial lining of the blood vessels than we can readily appreciate, a possibility which Baldassari has shown to exist by his observations on the endocardium in cases of infection and intoxication. Certainly it seems simpler to look at the process in this way than to suspect that normal endothelial cells in the aorta are fortunate enough to be able to seize single organisms from the rapidly flowing stream of blood that passes them.

CONCLUSIONS.

1. The case here reported is the eleventh of acute tuberculous endaortitis.
2. The aortic tubercles were the result not of extension but of metastasis from chronic lesions in the kidney.
3. The general miliary tuberculosis that co-existed with the chronic tuberculosis, was not the result of dissemination of organisms from the aortic lesions.
4. The bacilli in the aortic lesions showed bizarre forms with a tendency to branching.

ILLUSTRATIONS.

FIG. 1.—Intimal tubercle. Drawn with camera lucida to show the general microscopic appearance.

FIG. 2.—An edge of the intimal tubercle showing the finer structure of the nodule.

FIG. 3.—Examples of acid fast bacilli showing bizarre shapes.

REFERENCES.

Longcope: Johns Hopkins Hosp. Bull., 1901.
Benda: Lubarsch u. Ostertag's Ergebnisse, 1899.
——. Berl. klin. Wchnschr., 1899.
Blumer: Am. J. M. Sc., 1899, Albany M. Ann., 1899.
Schmorl: München. med. Wchnschr., 1902.
Luksch: Centralbl. f. allg. Path., 1904 (Ref.).
Forssner: Ibid, 1905 (Lit.).
Simnitsky: (Cited by Forssner.)
Gaylord: Allbutt's System of Medicine, 1909 (cited by Forssner and Longcope).
Schuchardt: Virchow's Archiv, 1882.
Marchand: Cited by Weigert. Virchow's Archiv, LXXXVIII.
Huber: Cited by Weigert. Virchow's Archiv, LXXXVIII.
Hanot: Sem. méd., 1895.
Hanot et Levi: Arch. d. méd. exp., 1896.
Flexner: Johns Hopkins Hosp. Bull., 1891.
Stroebe: Centralbl. f. allg. Path., 1897.
Aschoff: Verhandl. d. deutsch. path. Gesellsch., 1899.
Buttermilch: Lubarsch u. Ostertag's Ergebnisse, VI.
Kamen: Ziegler's Beiträge, XVII.
Dittrich: Cited by Blumer.
Hanau u. Sigg: Lubarsch u. Ostertag's Ergebnisse, V.
Baldassari: Centrabl. f. allg. Path., 1909.

REPORT OF A CASE OF EXTENSIVE TIERSCH SKIN GRAFT.

By W. D. GATCH, M. D.,
Assistant Resident Surgeon, Johns Hopkins Hospital, Baltimore.

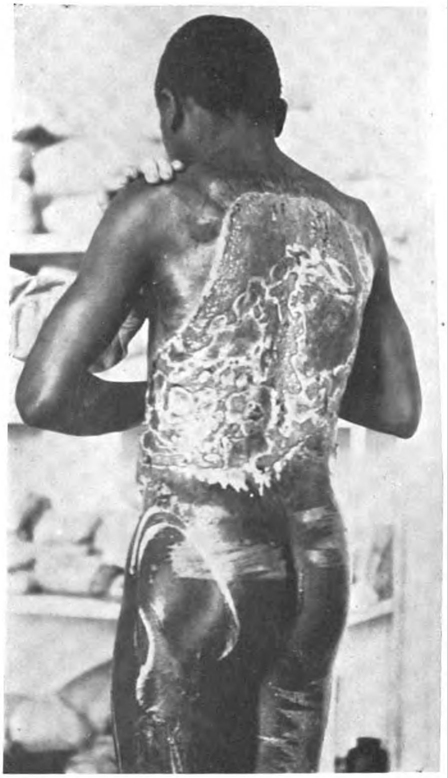
(From the Clinic of Professor W. S. Halsted.)

The case herewith reported has two points of chief interest: the large size of the area grafted, and the demonstration by repeated trials, that only homografts would take in this patient.

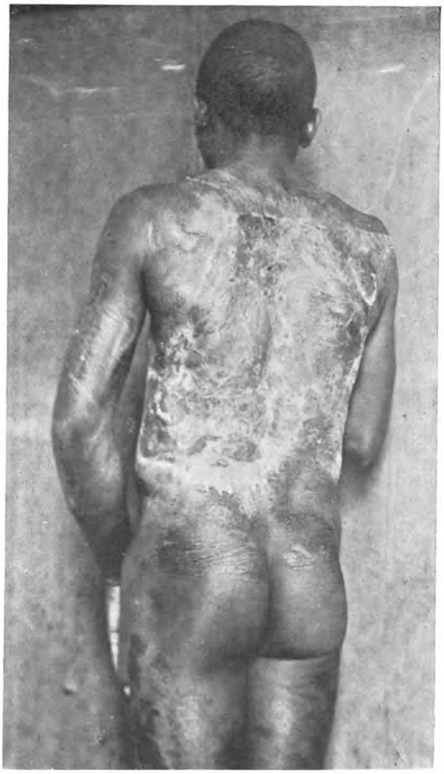
CLINICAL HISTORY.

J. C., colored, was admitted to the Johns Hopkins Hospital on November 21, 1909, for flame burns of the back and of the left forearm and hand which he had received fourteen hours before admission. The burn of the back was of the second degree, the others of the first. The photographs show the situation and extent of the former lesion. The area of this was 430 square inches. As the total area of the patient's body is about 2800 square inches, the burn occupied between a sixth and a seventh of his entire cutaneous area.

The patient recovered from the immediate effects of the injury rapidly and with very little general systemic disturbance. While the sloughs were separating the wounds were dressed with a single layer of dry gauze, which was left in place for periods of a week or more, and then changed after giving the patient a prolonged warm bath. Absorbent dressings, changed as often as necessary, were placed over the gauze. This dressing proved very clean and comfortable. It



Photograph Taken Dec. 13, 1910, Just Before the Application of the Final Graft.



Photograph Taken After Healing was Complete.

[illegible] two weeks the burned surface was covered with healthy granulations. Now followed a long series of attempts to cover the large raw area with skin. These I shall summarize briefly.

On December 16, 1909, 130 "pinch" grafts of rather large size were cut from the patient's thighs and planted over the lower part of the burn. About 110 of these lived, and, together with the epithelium which spread from them, covered an area of very considerable extent.

On December 23, 1909, at the suggestion of Dr. John Staige Davis, the experiment of grafting amniotic membrane was tried, but the epithelium of this failed to take.

On March 1, 1910, and again on March 18, 1910, large numbers of small whole-thickness grafts, obtained from two cases of lipectomy performed by Dr. Kelly, were applied, but these also were all unsuccessful.

On April 1, 1910, several large Tiersch grafts, cut from the patient's thigh, were spread over the granulations covering the right side of the chest. Most of this graft took, although the condition of the granulations was not so good as when the last two grafts were done.

On April 12, 1910, the granulations over the right scapula and the region immediately below were curetted away, and a large Tiersch graft, obtained from another patient, put over the curetted area. As had been the case with all the other isoplastic grafts, none of this lived.

No further attempts at grafting were then made for over five months. During this time the granulations became very deep and œdematous. In places they formed a gelatinous layer half an inch thick, the deeper parts of which were traversed by wide venous sinuses. About one-third of the total burn had now been covered by grafts. It was obvious that before further grafting could be done the granulations must be got rid of. Therefore the patient was anæsthetized (October 25, 1910) and the granulations curetted away down to the fascia, the bleeding being controlled with dry gauze. The cautery was found to cause as much hemorrhage as the curette. The patient was allowed to recover from this severe operation, and the curetted area to cover with fresh granulations. Following this at three separate operations the entire lesion was successfully covered with Tiersch grafts cut from the back of the thighs, and the left arm. These operations were done on November 9, November 23, and December 13.

With but one exception all the grafts were applied to healthy granulations prepared by simple irrigation with salt solution. The skin from which the grafts were cut was prepared by scrubbing with soap and water which was rinsed off with alcohol, and the latter with sterile salt solution. Silver foil dressings, which were usually left in place for ten days, were used. These were covered by very heavy rolls of absorbent cotton and gauze, all held in place by a crinoline jacket.

At present, two months after the last graft was applied, the new skin is freely movable on the fascia beneath. There is no tendency to keloid formation. The mobility of the back is practically normal. The areas from which the grafts were cut are very darkly pigmented. This was true for a time of the grafts also, but the latter are gradually fading to the light chocolate color of the rest of the skin. The total area grafted, determined by tracing its boundaries on a piece of moist crinoline applied over it, is 212 square inches in extent.

None of the isografts applied to this patient lived, though applied under the same conditions as the homografts, practically all of which did so. Dr. J. S. Davis, who has reviewed the cases of skin grafting at the Johns Hopkins Hospital (The Johns Hopkins Hospital Reports, vol. XV, page 307), found that in 499 cases of homodermic Tiersch grafts there were but 13 failures, or 2 3-5 per cent, while in 42 cases of isodermic Tiersch grafts there were five failures or 12 per cent. It has been demonstrated that isografts of highly specialized tissues take far less readily than homografts.[*] The same is true, but to a less degree of skin grafts.

I desire to thank Mr. Ives and Mr. Fullerton, of the present fourth year medical class of the Johns Hopkins Medical School, for their careful daily dressings of this case for over three months.

---

[*] W. S. Halsted, Journal of Experimental Medicine, 1909, XI, 175.

TWO CASES OF CONGENITAL HÆMOLYTIC JAUNDICE WITH SPLENOMEGALY. OBSERVATIONS ON HÆMOLYTIC JAUNDICE.

By William S. Thayer, M. D.,
Professor of Clinical Medicine, Johns Hopkins University,

and

Roger S. Morris, M. D.,
Associate in Medicine, Johns Hopkins University.

In 1900 Minkowski reported the history of a group of indi- iduals belonging to one family, all of whom showed a remark- ble syndrome characterised by chronic acholuric jaundice, lenomegaly and urobilinuria. The appearance of these mptoms could be traced through three generations affecting least eight members of the family. The general health of these individuals was not essentially impaired and no important changes were observed in the blood.

Bettmann, in the same year, described a similar case in which the jaundice displayed marked variations in intensity, deepening after exercise, food, drink and excitement, especially anger, and also after exposure to cold. An experimental hæmoglobinuria might be produced in this case by the application of cold.

Pick (1903) and von Kranhals (1904) reported like cases, the latter having observed a family of which nine members in three generations showed a chronic congenital splenomegalic jaundice. In all instances the stools were of normal color. The urine which was of a dark color, was free from albumen, blood and hæmoglobin; it showed constantly the presence of urobilin, but never of bile. The number of red corpuscles was below normal, 2,300,000 and 3,500,000 respectively, in the men, and, on one occasion, as low as 1,000,000 in one of the women. The hæmoglobin ranged between 55% and 65%. The red blood corpuscles were irregular in contour and varied in size from 6 to 10 μ. There were no nucleated reds but well marked polychromatophilia.

Minkowski was fortunate in obtaining a necropsy of one of his patients. No especial changes were found in the liver, and the bile passages were quite clear. A small pigment stone was found in the gall bladder. The spleen was enlarged, and microscopically there were simple hyperplasia and hyperæmia. The kidneys showed a brownish discoloration produced by a granular pigment deposit in the epithelial cells of the convoluted tubules. Not only did this pigment give an intense reaction for iron, but there was a large amount of material united with proteids which gave the reaction only after boiling with ammonium sulphide. From but one kidney about 0.95 grammes of pure iron was obtained. Similar pigmentation did not appear in any other organ.

Minkowski regarded the condition as dependent on an anomaly of the blood pigment transformation, perhaps consequent upon a primary change in the spleen.

The clinical picture was not a new one. Similar observations had been made before by Murchison (1883), Wilson (1890) and Le Gendre (1897), and the syndrome appears to be similar to the Chronic Simple Jaundice with Splenomegaly of Gilbert and the Chronic Infectious Jaundice of Hayem (1898). It was, however, Minkowski's observation and necropsy report that first brought this condition sharply before the medical world. During the seven years following Minkowski's original communication, a considerable number of similar observations found their way into the literature: Chauffard (1901); Barlow and Shaw (1902); Mason (1902); Widal and Ravaut (1902); Arkwright (1903); Lortat-Jacob and Sabaréanu (1904); Caporali (1905); Claus and Kalberlah (1906); Strauss (1906); Benjamin and Sluka (1907).

These cases seem to bear a striking resemblance one to another and suggest a common cause. The absence of evidence of hepatic disease and the existence of extensive siderosis, especially of the kidney, in some respects analogous to that seen in Addisonian anæmia, on which Hunter especially has insisted, point to an increased blood destruction as a primary cause of the disease—an hypothesis adopted by most of these authorities.

In 1907 Chauffard made an interesting contribution to the study of this syndrome by the discovery in a similar case of a marked fragility of the red blood corpuscles on exposure to hypotonic solutions of sodium chloride according to the method of Vaquez and Ribierre. This observation he was able to confirm in two patients presenting a similar syndrome in the wards of his colleague Widal. Thus, while with the normal red blood corpuscles hæmolysis begins at .42%-.44% and is complete at .32%, in these three cases the beginning and end of hæmolysis were respectively .62% and .36%, .60% and .34%, and .52% and .18%. The average size of the red blood corpuscles was somewhat diminished.

Widal and Philibert on further study, were unable to demonstrate the presence of any hæmolytic properties in the serum of their own patients, either with regard to their own corpuscles or those of other individuals. This fragility of the red blood corpuscles, so marked toward hypotonic salt solutions, was also evident in respect to other hæmolytic substances. The diminished resistance of the red blood corpuscles has been a constant feature in the considerable number of cases of this malady which have since then been reported.

A few months later Chauffard described another interesting hæmatological feature which he had observed in all cases of this disease which had come under his observation, namely: the presence, on vital staining of a peculiar basophilic granulation of the red blood corpuscles. Chauffard's first studies were made by staining freshly made and fixed smears of blood with Pappenheim's (pyronin and methyl-green) solution. Many of the red blood corpuscles which are of a slightly grayish color and barely visible, having lost their refractiveness with their hæmoglobin, show a fine granulation of a bright red color. These dots, generally arranged about the periphery, are sometimes scattered throughout the cells in the form of a definite granulation. The granular corpuscles are usually somewhat larger than their neighbors; they may be demonstrated well by the method of vital staining of Widal, Abrami and Brulé.

Four to six drops of blood are allowed to fall into a test tube containing 10 drops of a basic coloring matter which is quite isotonic and contains in addition oxalate of potassium to prevent the coagulation of the blood.

$$\left.\begin{array}{l}\textbf{Oxalate of potassium, 20\%, 2 cc.}\\ \textbf{Unna's polychrome methylene blue, 100 drops}\end{array}\right\}\Delta=-0.60$$

The fresh corpuscles are allowed to remain for 10 to 20 minutes in contact with the solution, after which the mixture is centrifugalized, the supernatant fluid is removed, and the corpuscles drawn up with a pipette and placed upon slides upon which they are spread as an ordinary drop of blood; the covers are then dried and fixed by heat. Such preparations may be preserved indefinitely.

The distribution of the granules is irregular. Sometimes scattered, they are usually collected in groups of two and three. Sometimes they are arranged in the form of a wreath or crown at the periphery of the corpuscle; they are generally distributed in such a manner as to suggest filaments wound around within the cell and showing frequent varicosities; they are unequal in size and of irregular form. Not infrequently granular net-work is gathered together toward the pe- ery or near the centre of the cell in such a manner as to gest grossly a nucleus.

brazès has called these corpuscles "granulo-reticulo-fila-tous." The apparent reticulum is very adherent to the blood corpuscle. If a dried and stained specimen be washed pure water the corpuscles lose their blue color, while the ular filamentous appearance remains. Indeed, in some the reticulum may be found outside the corpuscle, lying een other well preserved elements. Widal, Abrami and lé have thought that the polychromatophilia which is pres-to a certain extent in these cases, bears a close relation to presence of granular corpuscles, but this does not appear an absolute rule.

is exceedingly interesting to see how closely these observers e in their descriptions of this granulation with the careful ies of Vaughan (1903). Although originally described by penheim,* the first careful studies upon the vital staining e red blood corpuscles were made by Vaughan, who found this granulation was present in somewhat under 1% of red blood corpuscles of normal individuals. In the new-, where they are most frequent, the highest percentage but one exception (7%) was 4%. In pernicious anæmia active regeneration, they were found in great numbers e as high as 18%). In congenital icterus with splenomeg-the percentage is usually over 10%, and figures as high 0% have been reported. Chalier, however, in his excellent ograph, is inclined to regard these figures as excessive, rting that he, himself, has never seen a percentage above This granulation, it is needless to say, is quite distinct the basophilic granulation of Grawitz and others. The ules are different in shape and arrangement and are not stained in the fixed specimen. They are, of course, quite nct from the remarkable Schüffner's granules which ap-with Romanovsky's stain in certain parasitiferous cor-es in tertian and æstivo-autumnal malaria.

is probable that this phenomenon is simply an indication tive blood regeneration (Vaughan, Ferrata), but there are rently few conditions in which the frequency of these lar corpuscles compares with that in congenital jaun--a fact which seems to give them a real diagnostic

ese observations have been confirmed by a considerable er of observers, and the picture of this disease, which fard has called hæmolytic jaundice, is sufficiently definite regarded as a distinct clinical entity.

patient often belongs to a family other members of have suffered from the same condition. Early in life, mes immediately after birth, but in other cases later, s not until puberty, a jaundice appears. This jaundice lly of a moderate degree varying from a pale lemon hue ell marked golden yellow. It is remarkably variable, increasing often under physical effort or emotional excitement. The stools are of normal color or pleiochromic, especially under those conditions associated with increase in jaundice.

The urine is of rather high color, often of a brownish almost mahogany hue, but free from bile. Urobilin is usually demonstrable. The blood shows an anæmia of moderate degree, generally between 3,000,000 and 4,000,000 red corpuscles, although in one case a blood count of under 2,000,000 is reported. There is usually considerable anisocytosis, but little or no poikilocytosis. The average size of the corpuscles is sometimes rather below the normal, a point upon which Chauffard particularly has insisted. The color index is somewhat reduced. Polychromatophilia is usually well marked. On vital staining the granulation described by Pappenheim, Vaughan, Sabrazès, Chauffard and others is present in a large number of corpuscles. The percentage of granular elements is usually above 10% and may be as high as 20%, or even more. The serum is of a clear, yellowish color, and the test for bilirubin is positive. Urobilin is generally undemonstrable. The leukocytes are usually of normal number or slightly increased. The differential count shows nothing remarkable beyond evidences of increased marrow activity as manifested by a high percentage of eosinophiles and the occasional presence of myelocytes and nucleated red cells—normoblasts.

The serum shows a rather high degree of hypertonicity. Starkiewicz regarded this condition as a mechanism of defense on the part of the organism to protect the fragile red corpuscles. Troisier, however, believes it to be the result of exosmosis of the corpuscular salts as a result of the fragility of the red cells.

The remarkable feature of this interesting condition is that subjective symptoms are usually absent despite the constant anæmia. The patients are generally unconscious of any disability. They appear to adapt themselves so well to their condition that it is only occasionally that a complaint is elicited. There is a complete absence of all the ordinary phenomena of biliary intoxication: there is no bradycardia; no pruritus; no tendency to hæmorrhage; no xanthelasma. The patients are, indeed, as Chauffard has gracefully said, "à peine des malades—plutôt des ictériques que des malades"—barely patients, rather icterics than patients.

There is one exception to this rule. Many of these individuals suffer from attacks of abdominal pain suggestive of biliary colic. These pains, localized in the epigastrium and in the region of the gall bladder, are often accompanied by fever and by an aggravation of the jaundice. In a number of instances they have been so severe as to lead to operation. In many cases it is probable that the attacks are due to the presence of small pigment stones in the gall bladder, such as have been found in four of the six cases of congenital jaundice that have come to necropsy—every instance but one in which the gall bladder was examined.

In the last several years the authors have had the opportunity of observing two striking cases of congenital hæmolytic jaundice which appear to be worthy a note of record.

---

s subject is well discussed by Ferrata who, however, in with every continental author, ignores Vaughan's excel- k.

Case I.—Miss X., 16 years of age, a school girl, consulted one of us (W. S. T.) on the 30th of May, 1906, with a complaint of jaundice. Her father and mother were well and strong. She has one sister, younger than herself, who is perfectly well, and the family history in other respects, is good.

Her mother states that as an infant the patient used to have slight attacks of jaundice for which they were accustomed to give her calomel, but as she grew older the attacks became more frequent until, finally, the jaundice became permanent. The yellow color has varied in intensity from time to time, but the mother is not sure that it has ever been wholly absent. It has been deeper as a rule at the time of menstruation, and worse after exertion and bad colds, or with any indisposition. Six years ago the patient had a febrile attack which was regarded as typhoid fever. In other respects she has been a strong healthy girl, taking part in all the out-of-door games of her companions. She is not conscious of having been short of breath.

Eight months ago she began to have occasional attacks of pain in the right side of the epigastrium, lasting from ten to twenty minutes. Of these attacks she has had several. Three weeks ago she had a paroxysm of sharp, cramp-like pains in the same position, so sharp that at times while at school she had to lie down; there has been no fever with any of these attacks, but in the last three weeks she has had more or less pain, usually every other day. Lately the jaundice has been worse, but it is the pain that has excited the attention of her parents.

In other respects she had felt perfectly well and only recently, since she has grown older, she has been somewhat annoyed by the consciousness of her jaundice.

On examination there was a distinct jaundice although in other respects the color of the patient was that of a healthy girl; the tongue was clean; pulse 19 to the quarter, regular, not remarkable. Examination of heart and lungs negative.

Abdomen, natural; no tenderness on pressure in the region of the gall bladder; palpation, negative, although, on light percussion, there is possibly a very slight suggestion of dulness in the region of the gall bladder. The spleen in readily palpable, descending on deep inspiration at least 4 cm. below the costal margin.

Widal reaction, negative.

Blood:

R. b. c.	3,680,000
W. b. c.	800,500
Hb.	70-71%

Dried and stained specimens showed the red blood corpuscles of about normal size with but slight variation in diameter; the color is good; no marked polychromatophilia. Their contour is fairly regular, but there is some distortion, a few elliptical and dumbell shapes being found. No nucleated reds.

Differential count:

Polymorphonuclear neutrophiles	72.5 %
Small mononuclears	18.0%
Large mononuclears	7.5 %
Transitionals	1.5 %
Eosinophiles	.5 %

The case was regarded as one of chronic, congenital jaundice with splenomegaly of the type described by Minkowsky. There was a question as to the existence of gall stones, but, in the absence of severe symptoms, operation was not advised. Blaud's pills to be continued through long periods of time, were prescribed.

Three years later, having become familiar with the work of Chauffard, Widal and others, the writer requested the parents of the patient to allow him to see her again. She was accordingly seen on the 20th of March, 1909. Jaundice had been present for the greater part of the preceding three years, although the patient had grown and developed normally and was a perfectly healthy looking girl. The mother says that after long periods in the house she becomes more jaundiced and that dancing, violent exercise and bad colds make it worse. It is worse at the catamenial periods, better just afterwards. The author's note on this occasion reads:

"Strong, healthy looking girl; color good; tongue clean. There is a distinct slight jaundice of the skin and conjunctivæ. Pulse 22 to the quarter, regular, not remarkable in quality. Heart sounds, clear at the apex and base.

Abdomen: natural in appearance. Spleen, readily felt just below the costal margin, descending on deep breath 3 or 4 cm. below. It seems smaller than when last seen. The liver descends [illegible] below the costal margin on deep breathing; flatness above at about the 6th rib, extending to the costal margin. Gall bladder not felt.

Blood:

R. b. c.	3,200,000
Hb.	75%

Resistance of the red blood cells: 1 cc. of blood was collected in 9 cc. of 1% aqueous sodium fluoride solution, and the corpuscles were subsequently washed three times in 0.85% NaCl solution. A 5% suspension of the red corpuscles in 0.85% salt solution was prepared. The corpuscles were then placed in solutions of NaCl of varying strength and the first trace of hæmolysis (minimal resistance) and complete hæmolysis (maximal resistance) noted. The results showed:

Minimal resistance	0.68% NaCl.
Maximal resistance	0.45% "

After centrifugalizing the blood-sodium fluoride mixture, the supernatant fluid was found to be of a canary yellow color. It was pipetted off and tested for urobilin and bilirubin. Neither pigment could be demonstrated, using the technique described by Conner and Roper.

Urine.—Fresh specimen March 20, 1909. Brownish yellow, clear, acid, sp. gr. 1.014; albumen and sugar absent; bile: foam white; tests with yellow nitric acid negative. Trousseau's test (tincture of iodine) negative. Urobilin: marked green fluorescence on treating the amylic alcohol extract with 1% $ZnCl_2$ in ammoniacal alcohol; also positive on spectroscopic examination.

On the 4th of April, after taking Blaud's pills gr. V, t.i.d. for two weeks, the patient allowed us to make another examination of the blood:

R. b. c.	3,800,000
W. b. c.	5,200
Hb.	84% (Dare.)

Vital staining of fresh blood with Unna's polychrome methylene blue, according to the method of Vaughan, showed 149 red cells with basophilic granulations out of 1228 cells examined, or about 12.1% (normal = 0.5% to 1.8%.—Vaughan).

Differential count of 564 cells with Ehrlich's triacid stain:

Lymphocytes	18.6%
Large mononuclears and transitionals	3.5%
Polymorphonuclears, neutrophilic	73.0%
Polymorphonuclears, eosinophilic	1.2%
Polymorphonuclears, basophilic	0.7%
Myelocyte, neutrophilic	0.17%
Degenerated	2.6%

Wilson's stain (Romanovsky) and the triacid stain were used in studying the red cells. There was moderate anisocytosis and poikilocytosis. The red cells were of good color and no polychromatophilia, basophilic granules, nuclear particles, Cabot's rings were

or few in number in the stained specimens.

sistance of the red blood corpuscles:

Minimal resistance	0.72% NaCl.
Maximal resistance	0.42% "

e blood plasma-sodium fluoride mixture was again of a bril- canary yellow color. Using the methods recommended by er and Roper, bilirubin was demonstrated; tests for urobilin negative.

ine.—Fresh specimen, April 8, 1909. Yellowish brown, clear, sp. gr. 1.024; albumen, sugar and bile, absent. Urobilin: ed positive reaction, both chemical and spectroscopic. Micro- cal examination showed a few squamous epithelial cells; wise negative.

ol.—Dark brown, small, constipated stool. No blood, pus or s. Microscopical examination: a few muscle fibers without tions, many yeast cells. No ova or parasites. Schmidt's test entrated corrosive sublimate) positive for urobilin, negative ilirubin.

od.—The average diameter of 500 red corpuscles in dried and ed specimens (Wilson's modification of Romanovsky) was . The variations were between 5 and 9.4 μ—essentially nor- neasurements.

July of the same year the patient was seen in Europe. At time she seemed perfectly well but showed, as always, a dis- slight jaundice of the skin and conjunctivæ.

e general appearance of the patient was very remarkable. out observation one would have picked her out as a perfectly hy girl; her cheeks were red and her expression bright, the al nourishment good and it was a matter of great surprise to o marked an anæmia. She had never been short of breath omplained of no subjective symptoms of anæmia.

e second case was seen in the wards of Prof. Barker, to courtesy we are indebted for the privilege of reporting ase.

E II. (Med. No. 23623).—F. B., single, age 27, a manicurist, dmitted to the hospital on January 22, 1909, complaining of ice. The family and personal history are good. No other er of the family is jaundiced. The patient has had measles numps at the same age and whooping-cough at 12. During st twelve years there have been occasional attacks of major ia, usually following mental shock. There has been chronic pation. The patient has been jaundiced since she was three old; the jaundice is variable, sometimes very deep and scarcely noticable. Since the age of 16 she has complained at she called bilious spells about twice a month. While g in the morning she becomes nauseated, vomiting one or nces of fluid, at first like water and then almost pure bile. minutes after vomiting she feels relieved and is able to go k.

e is no history of pain in the region of the gall bladder, or atemesis. The patient has not passed acholic or bloody to her knowledge. She has had no abdominal pain. In olecystostomy was performed by Dr. John D. Blake. No nes were found.

t two months ago the patient began to have a "dead, pain" a little below the right scapula; the pain seldom There has been slight pain occasionally above the left Her average weight is 138 lbs.; in the last three months lost 13 lbs.

presens. (Dr. Boggs).—The patient is well nourished. a marked icteric tint to the entire skin, the scleræ and the membranes. No xanthoma. The lungs are negative. Apex is just felt in the 4th interspace 9.5 cm. to the left of the median line. Relative cardiac dulness extends 10.5 cm. to the left in the 5th, 3.5 cm. to the right in the 3rd interspace, and above to the 3d rib. There is a soft systolic blow at the apex, transmitted to the axilla. Pulmonic second sound accentuated. There is a blowing systolic murmur over the conus.

Abdomen: Spleen extends 4 cm. downward and forward beyond the costal margin. Liver not palpable. No hæmorrhages noted.

Jan. 29. (Dr. Thayer). Perfectly healthy looking woman with yellowish type of jaundice. Tongue clean. Abdomen slightly more prominent on left. Spleen readily palpable. Liver not enlarged.

Feb. 5. (Dr. Hanes). Since admission the patient's only complaint, jaundice, has varied very markedly from a light yellow to a deep lemon color. The scleræ are constantly yellow and do not vary as much as the skin. The heart is as noted before,—the systolic blow is very faint and is not transmitted to the axilla. Spleen still enlarged, edge firm and sharp. Patient discharged.

During the patient's stay in the hospital, her blood pressure (systolic) varied between 100 and 118 mm. Hg. The temperature was between 97.6° and 100.2° F. Pulse 60 to 83, respirations 18 to 20.

Blood examinations:

Jan. 23.	R. b. c.	3,800,000
	W. b. c.	8,900
	Hb.	70%

In the fresh blood the red cells appear normal in color and shape. No nucleated reds or parasites.

Jan. 26. Wasserman reaction negative. Coagulation time, 5 min.

Jan. 27. Blood count practically the same as on the 23d.

Jan. 28. (Dr. Hanes). The patient's blood serum is of a golden yellow color, and the HNO_3 test for bile is positive.

Jan. 29. (Dr. Rous). "Resistance of the red blood cells to hypotonic salt solution. Into a series of tubes containing 1 cc. each of dilute salt solution 20 mm. of the patient's whole blood were dropped. The dilutions comprised a series from 0.85% to 0.10% NaCl. As control, the blood of S., who had about the same number of cells per cm., was taken. The corpuscles of S. showed complete hæmolysis at a dilution of 0.30% and those of the patient at 0.40%. (This is an immediate observation). After 24 hours the reading showed a trace of hæmolysis at 0.55% for S., and about the same at 0.75% for the patient."

Differential count of 400 cells showed:

Lymphocytes	47.0 %
Large mononuclears and transitionals...	5.25%
Polymorphonuclear neutrophiles	46.0 %
Polymorphonuclear eosinophiles	0.5 %
Mast cells	0.25%
Unclassified	0.75%

Feb. 3.	R. b. c.	3,700,000
	W. b. c.	10,500
	Hb.	76%
	Viscosity 4.1 (in terms of distilled water).	

Stool examinations were made on Jan. 27 and 29 and on Feb. 3. Schmidt's test showed only hydrobilirubin. Microscopically nothing of importance was found.

Urine was examined on six different days. Sp. gr. 1.018 to 1.030. There was no albumin or sugar. No bile or bilirubin was demonstrated. Urobilin was tested for apparently only on Feb. 4th, when the report says, "Schlesinger's urobilin test negative. Spectroscopic examination inconclusive." The color of the urine was described as brownish yellow and orange.

It is rather unfortunate that more careful tests for urobilin were not made; it must have been present.

All attempts to communicate with the patient since her discharge from the hospital have failed.

These cases are typical examples of this condition. Although both patients showed a well-marked jaundice, in neither was there the slightest disturbance in the shape of itching; in neither was there bradycardia. The complaint of the second patient bore apparently no relation to her jaundice. The extraordinary manner in which these individuals adapt themselves, as it were, to their anæmia, is strikingly illustrated by both of our patients, especially by the first, whose appearance and history were not of a delicate but rather of a robust, strong girl.

A striking peculiarity in the observations made upon this case is the remarkably high point of concentration of the solutions of sodium chloride at which complete hæmolysis appears, .42% and .45%, a concentration equal to or above that at which, in the normal individual, hæmolysis begins.

Acquired Hæmolytic Jaundice.—This remarkable syndrome, chronic acholuric pleiochromic jaundice without the usual symptoms of biliary intoxication, associated with anæmia, enlarged spleen, and siderosis of the viscera is not, however, always of congenital origin. Soon after Chauffard's first observations, Widal and Abrami, Chauffard and Troisier, Le Gendre and Brulé, von Stejskal, Oettinger, Parkes-Weber and others reported a series of interesting observations in which a similar train of symptoms came on without apparent cause in adult life. The onset of the jaundice in these instances followed various different accidents—an ischio-rectal abcess (Widal and Abrami), hæmorrhage following a miscarriage (Widal and Abrami), severe nervous shock (Chauffard and Troisier), acute gastro-enteritis (Le Gendre and Brulé). In other instances, such as the two cases of von Stejskal, that of Oettinger, and that of Parkes-Weber, the process seems to have appeared without striking initial symptoms. Again, in a considerable group of cases a jaundice of a transient character presenting similar hæmatological phenomena—an anæmia with signs of regenerative activity of the bone marrow, granular corpuscles on vital staining and a marked fragility of the red cells, has been observed in the course of a variety of conditions, cancer of the stomach (Chalier); cirrhosis of the liver (Chalier and Le Play); malaria (Sacquépée, Chalier); repeated hæmorrhages in cancer of the bladder (Widal and Joltrain); streptococcus infection (Sacquépée); uncinariasis (Darré); syphilis (Gaucher and Giroux); monary tuberculosis (Landouzy); pul- jaundice of the new born (Sabrazès and Leuret; Cathala and Daunay).

This acquired hæmolytic jaundice, as it has been called by Widal and Abrami, who described the first cases, does not constitute a definite disease picture to the same extent as does congenital splenomegalic jaundice, but rather an interesting syndrome. Acquired hæmolytic jaundice may be divided, as suggested by Brulé, into apparently *primary* and *secondary* cases. The former arise either without apparent cause or during the course of some acute transient malady, after which they persist with seeming independence. Secondary hæmolytic jaundice is observed in a transient manner associated with acute infections or poisons, or as a terminal phenomenon in the course of some chronic disease.

One essential difference exists between most of the cases of acquired hæmolytic jaundice and the congenital malady, namely: the existence in the former of an anæmia sufficiently grave to occupy a prominent position in the clinical picture. The anæmia may, indeed, be intense and is associated with the usual subjective symptoms. There are often striking variations in the intensity of the jaundice and the grade of anæmia. Sudden paroxysms of fever associated with painful swelling of the spleen and extremely rapid fall in the number of red corpuscles have been described.

A patient of Widal and Abrami's showed, on the 19th May, 2,600,000 red blood corpuscles; ten days later, while in apparently good condition, there appeared severe headache, dyspnœa, marked exacerbation of the jaundice, and in a day or two the blood count showed but 850,000 red elements. In one of von Stejskal's cases the blood count rose in eighty days from 640,000 to 4,000,000.

The blood picture is often very similar to that in pernicious anæmia; marked oligocythæmia; a high color index; anisocytosis; poikilocytosis; often an increase in the average corpuscular diameter. There are almost always marked evidences of marrow activity in the shape of nucleated red blood corpuscles among which megaloblasts are often found. Contrary to what one sees in pernicious anæmia, the leukocytes are usually somewhat increased, and, occasionally, there is a well-marked leucocytosis, which, on differential count, shows a considerable proportion of myelocytes and a large percentage of eosinophiles. Granular corpuscles are present on vital staining as in the congenital form of the disease; sometimes, however, these are not so numerous.

There are two striking points of difference in the hæmatological picture between acquired and congenital hæmolytic jaundice. The corpuscular fragility, so evident in the former condition, is often very slight in the acquired disease when the test is made with unwashed corpuscles.

Widal and Abrami showed early that in acquired hæmolytic jaundice the corpuscular fragility may, indeed, be almost inappreciable if the test be made with the whole blood. With deplasmatized corpuscles, however, the resistance is distinctly, sometimes very markedly, diminished. These authors showed that this increased fragility of the deplasmatized red corpuscles is common to both congenital and acquired varieties of the disease with the essential difference that while in congenital hæmolytic jaundice the fragility is usually demonstrable with the whole blood, in the acquired condition the resistance of the whole blood may be normal, while that of the deplasmatized corpuscles may show a very marked reduction. The deplasmatized red blood corpuscles of acquired hæmolytic jaundice show also a distinct diminution in resistance toward other hæmolytic substances, such as anti-human sera of all sorts and leech extract.

In normal blood the resistance of the deplasmatized corpuscles does not differ essentially from that of the whole blood.

While it is difficult to avoid the conclusion that this increased corpuscular fragility has a definite association with the hæmolysis which occurs in these cases, yet it should be

~~degree of fragility~~ and the extent of the anæmia. The ditions existing in congenital and acquired hæmolytic ıdice form an interesting paradox, as has been pointed out Brulé; on the one hand a marked corpuscular fragility ciated with a moderate anæmia, on the other a moderate ;ility and an intense anæmia. "It is impossible to draw a ct conclusion as to the fragility of the red blood corpuscles he organism from their fragility in vitro."

'his diminution in the resistance of the deplasmatized cor- cles may be restored if they be brought into contact again ı their plasma. Although there is a slight difference be- ɔn the resistance of the corpuscles according to the manner which they are separated from their plasma (Iscovesco, gnat), yet these differences are so slight that they need not considered; in fact the quantity of serum necessary to ore the resistance of separated corpuscles is so large that, tically, it is unnecessary to wash the corpuscles deplas- ized in an oxalate solution. The anti-hæmolytic power of serum is not restricted to that of the patient himself. It resent in other and heterologous sera. Heating to 56° C. a considerable period of time does not remove the power. re would then appear to be no evidence of the existence of pecific anti-hæmolytic substance. Widal, Abrami and lé believe that the anti-hæmolytic power is dependent on e special physical property or properties of the serum.

he blood of some individuals with acquired hæmolytic jaun- possesses one characteristic which, for the moment, ears to be rather special, and is not observed in the con- ital forms, namely, an auto-agglutinative power of the ım. The test is a relatively simple one; it is thus de- ɔed by Brulé.

>)ne lets fall into a watch glass 10 drops of the patient's serum then a drop of red blood corpuscles isolated by centrifugation: nixture is shaken up and then allowed to rest. Soon the cor- les are seen to gather at the bottom, sometimes appearing to little masses. But if there is no auto-agglutination, we need o shake the glass slightly to restore the mixture to its pre- homogeneity and to disperse the corpuscles in the serum. ɜ auto-agglutination be positive, one sees after a period vary- ccording to the intensity of the phenomenon, from one to y minutes, a collection of the corpuscles into little granules perceptible by the naked eye, which give the emulsion an t comparable to brick dust; violent and prolonged shaking t dissociate these corpuscles. Little by little the agglutina- ncreases, the corpuscles gather at the bottom of the watch where they form an homogeneous pellicle, the supernatant becomes limpid, and shaking no longer dissociates the tic pellicle. If at the beginning of the phenomenon one nes a drop of the serum microscopically it may be seen that rpuscles, instead of disposing themselves in rouleaux as lly, gather in little islands, between which there float a few d corpuscles."

s phenomenon has been found in a number of instances ired hæmolytic jaundice. In others, such as the cases dal and Joltrain, and that of Parkes-Weber, auto- nation has been absent. The phenomenon is interest- d may be of considerable diagnostic value. It is not in congenital hæmolytic jaundice, although the patient [illegible] and Sabrazes, whose jaundice is believed by the authors to have been acquired from a wet nurse, might be regarded as belonging to this class. It has, however, been observed in one instance of hepatogenous jaundice by Brulé. It should be said that it has not as yet been studied sufficiently to justify far-reaching conclusions as to its diagnostic value or significance.

Attacks of pain in the region of the gall bladder associated with fever and exacerbation of the jaundice are very common. Indeed, the first three reported cases (Widal and Abrami; Chauffard and Troisier) were all operated upon for suspected gall stones. In one of these cases a little bile sand was found; in the other instances the gall bladder was quite clear.

Acquired hæmolytic jaundice presents itself in a variety of forms. The most important are:

1. Those cases simulating cholelithiasis.
2. Those simulating pernicious anæmia with jaundice.
3. Those simulating a chronic infectious cholangitis, chronic, infectious, splenomegalic jaundice (Hayem).
4. It has also been observed in some of those conditions in which the most striking symptoms, anæmia and splenomegaly, leave one in doubt as to whether the case should be classed clinically as Banti's disease or a cirrhosis of Hanot's type. Recent studies by Chauffard and Troisier, as well as by Armand-Delille and Feuillé, suggest strongly the possible relationship between some so-called splenic anæmias and hæmolytic jaundice. Attention has also been called to this point by Parkes-Weber.

In other instances the condition may manifest itself under the symptoms of an *icterus gravis* (Roque and Chalier).

The syndrome is, however, sufficiently definite and easily to be recognized if carefully studied, by the absence of bile in the urine, its presence in the blood serum, the urobilinuria, the presence of a large percentage of granular corpuscles on vital staining, by the fragility of the red corpuscles, especially manifest with the deplasmatized elements, and by the commonly present auto-agglutinative power of the serum.

It is important to remember that in Addisonian anæmia and in cholelithiasis the corpuscular resistance is at least normal; indeed, as a rule, it appears to be increased. In one of my cases of pernicious anæmia hæmolysis began at only .325%, and was complete at .275%, a greatly increased resistance.

In obstructive jaundice Vaquez and Ribierre have also shown that the resistance of the red corpuscles is as a rule distinctly increased, an observation which we have been able to confirm.

Pathological Anatomy.—Several individuals presenting the syndrome of hæmolytic jaundice have come to necropsy (Vaquez, Giroux and Aubertin; Oettinger; Gandy and Brulé; Widal and Joltrain; Roque and Chalier; Micheli; Möller; Wilson; Tileston and Griffin). The cases of Vaquez, Giroux and Aubertin, Gandy and Brulé, Wilson, and Tileston and Griffin, were apparently of congenital origin; the others, probably acquired. In all cases, however, the essential features appear to have been general evidences of an hæmolytic process as manifested by a siderosis of liver, spleen and kidneys. The autopsy in the case of Vaquez and Giroux is of especial interest as it occurred in a congenital case in which death followed splenectomy, so that complications with other terminal processes were ruled out. The lesions which have been confirmed in the later cases, were as follows:

A marked congestion of the spleen especially confined to the pulp, the engorgement of which was in rather striking contrast to the relative emptiness of the sinuses. There were few macrophages in the splenic pulp, more in the sinuses. The endothelial cells were stuffed with iron containing pigment.

The liver showed no evidence of biliary obstruction, no angio-cholitis. Many of the liver cells, especially in the centro-lobular zones, were, however, stuffed with large granules of ochre pigment.

There was moderate siderosis of the cells of the convoluted tubules of the kidney, and marked hyperplasia of the marrow.

These observations have been confirmed, in great part, in all cases which have come to necropsy, affording thus abundant evidence of the hæmolytic character of the process. The siderosis of the kidney, which is usually present, has, however, been very moderate in some instances, and was apparently absent in Gandy and Brulé's case of congenital hæmolytic jaundice, where death occurred in the course of a pneumonia as well as in Micheli's instance of the acquired form of the disease. In no instance was there evidence of biliary obstruction.

Pathogenesis.—The pathogenesis of this remarkable syndrome is by no means clear. The evidence of a chronic hæmolytic process is not so very different, indeed, from that which one sees in various other conditions, such especially as Addisonian or bothriocephalus anæmia, conditions in which chronic jaundice is not uncommon. The clinical picture in some of the acquired forms of the disease with crises of aggravation of the malady, may almost resemble paroxysmal hæmoglobinuria. Here, as Donath and Landsteiner have shown, there is in the serum a true auto-hæmolysin. But in paroxysmal hæmoglobinuria there is no evidence of a diminished resistance of the red blood corpuscles.* In Addisonian anæmia, as has already been said, the resistance of the red blood corpuscles is usually increased.

On the other hand there is no evidence of a specific hæmolysin in these instances of jaundice associated with corpuscular fragility, so that one has been tempted to separate an hæmolysinic jaundice, such as the jaundice with pernicious anæmia or that seen with paroxysmal hæmoglobinuria, from the jaundice associated with corpuscular fragility, to which the name *hæmolytic* has come to be applied—a deplorable complication of terms.

This is, however, not to say that the primary causal element in some of the instances of so-called acquired hæmolytic jaundice may not be the presence of toxic hæmolytic substances in the organism. Indeed, there is some reason to believe that this may be the case. Troisier, for instance, in his recent thesis advances various arguments in support of the hypothesis that the fragility of the red corpuscles in these cases of hæmolytic jaundice is dependent upon the fact that they have already become sensitized by union with an hæmolytic amboceptor.

However this may be, we are in the presence of a remarkable clinical syndrome—acholuric, pleiochromic, jaundice, anæmia, corpuscular fragility, granulation of the red corpuscles on vital staining, post-mortem evidences of blood destruction in the form of siderosis of the liver, spleen and kidneys, absence of evidence of the presence of hæmolytic substances in the serum.

Several questions naturally suggest themselves.

1. Where does the hæmolysis take place?

2. Where does the bilirubin circulating in the blood find its origin?

3. What is the primary cause of this condition?

1. As to the manner and seat of the hæmolysis there has been varying opinions. Some (Minkowski, Chauffard, Vaquez) fancy that, gathered in the pulp of the spleen which, as has been seen, is always markedly engorged, the abnormally fragile corpuscles are there destroyed. Others (Widal and his pupils) are inclined to believe that the destruction occurs in the general circulation, the débris accumulating as it always does in the spleen, and accounting thus for the symptoms and manifestations on the part of that organ. One observation, as pointed out by Castaigne, is strongly in favor of the circulatory origin of the hæmolysis, namely, the siderosis of the kidneys, which is often demonstrable. Otherwise no important evidence can be adduced in support of one or the other of these views which, in the end, are essentially the same, excepting in so far as they bear upon the second question.

2. *The Cause of the Jaundice.*—Most observers have believed the jaundice to be immediately hepatic in origin due to the over-production of bile by a liver overstocked, so to speak, with the products of blood destruction. The old idea that this was, in a sense, after all, an obstructive jaundice owing to the inspissation of the bile and the engorgement of the intra-hepatic bile passages, or to a diffuse intrahepatic cholangitis, must, however, be abandoned as a result of the clinical and pathological observations of some of these cases. If the hepatic origin of the jaundice be accepted, we must fall back upon the assumption of Minkowski, that the overworked hepatic cell gives off a part of the excess of bile which it produces into the capillaries, as well as into the bile passages.

Widal and his pupils, however, advance another hypothesis which is in many ways inviting. Pointing out the rapidity with which jaundice follows experimental blood destruction in animals, they call attention to the lack of evidence of any inspissation of the bile, referring especially to one of their patients on whom a cholecystostomy was performed for suspected stone. The gall bladder and ducts were empty, and the bile which was discharged from the fistula in large quantigly fluid. On the hand they observe that Langhans and Quincke have nstrated bilirubin in the seat of old hæmorrhagic foci, Sabrazès and Muratet have observed the presence of in in cerebro-spinal fluid after cerebral hæmorrhage, hat Froin has shown that hæmoglobin may be changed iliary pigment in hæmorrhagic exudates in the meninges the pleura, observations which have been confirmed by in and Troisier, Widal and Joltrain and others. The in which various observers have demonstrated in the they believe to be due to a direct transformation from globin through bilirubin such as has been shown to occur morrhagic exudates (Troisier: Thèse). They point to ct that in cases presenting the syndrome of which we een speaking, despite the long-continued jaundice, there evidence of the ordinary symptoms of biliary retention, oms which they believe to be due to the action of biliary namely, pruritus, bradycardia and emaciation. Bile acids never been found in blood or urine. Nor do the red cles show the increased size and heightened resistance otonic salt solutions which Rist and Ribadeau-Dumas to indicate an acquired tolerance for intoxication by holate of sodium. Everything, they think, points to the ce of a purely pigmentary cholæmia which, theoretically, easily arise in the blood itself. This is a conceivable ductive hypothesis. The objections based upon the ab- of hæmoglobin in the circulation, which have been against this idea are answered by Widal by the assump- f a destruction of the corpuscles so gradual that the ity of hæmoglobin is too small to be recognizable. It t be said, however, that the symptoms of ordinary biliary cation are never present, rare though they be, for itching en observed in one or two instances. On the other hand gument that the absence of these symptoms is evidence purely pigmentary character of the jaundice is based false assumption, for King and Stewart have shown is, in fact, upon the bile pigment, that bradycardia s.

---

* It is true that Meyer and Emmerich believe that they have been able to demonstrate a diminished resistance of the red corpuscles in paroxysmal hæmoglobinuria against changes of temperature, dilute acids and saponin. Meyer and Emmerich: Ueber paroxysmale Hæmoglobinurie. Deutsches Arch. f. klin. Med., Leipsig, 1909, XCVI, 287-327.

at the moment impossible to form a definite opinion his question. While all recognize the hæmolysis as the cause of the jaundice, the majority of observers still a point of view similar to that of Vaquez and Auber- ich has been well summarized by Chalier. According the condition represents "a lesion of the blood of n cause terminating in destruction of the red blood les, in secondary splenic hyperplasia with the forma- an excess of iron-containing pigment and an over- ion of bile by the liver as a result of the superabun- pigment to transform, and, consecutively jaundice." own words (Vaquez and Aubertin), " . . . . if the cause of hæmolytic jaundice is in an alteration of the immediate cause is without doubt an increased func- tivity of the liver cell: there may exist, indeed, a er-activity of the liver just as there exists a glyco- r-activity of the liver, and hæmolytic icterus would n icterus through hepatic over-activity (*'ictère par hyper-hépatie'*)." Their idea as to the manner in which the bile pigment enters the blood is doubtless similar to that expressed by Leuret, "With the blood pigment modified by the spleen the hepatic cell proceeds to produce an excess of bilirubin to a degree such that in certain cases it overflows and secretes bile at both poles: whence hepatogenous icterus"—essentially the idea of Minkowski. The question must be regarded as still open, and there is much that would attract one to the hæmatogenous hypothesis of Widal, the argument in favor of this point of view being set forth strongly in the thesis of Troisier.

3. As to the third question, the primary cause of the corpuscular fragility, a positive answer cannot be given.

In congenital hæmolytic jaundice it has generally been assumed that the fragility of the red blood corpuscles is an inherited defect. The red cell, it might be fancied, has here failed to acquire those powers of resistance which are ordinarily gained in the first days of extra-uterine life, retaining permanently its original fragility. In the acquired forms of the disease the question is, however, by no means so simple. Widal, Abrami and Brulé, by intra-peritoneal injections of toluylendiamin, have produced in animals a jaundice with clinical and pathological phenomena similar to those observed in hæmolytic jaundice in the human being. According to the dose, the process was more acute and severe, or slower and more gradual and persisting for a long period after the last injection of the poison. No hæmolytic properties could be found in the serum. On the other hand the red blood corpuscles showed a markedly diminished resistance to hypotonic saline solutions as well as a granulation on vital staining, while evidences of increased marrow activity were striking. The urine in some of these cases, however, contained bile pigment. Obstructive jaundice in animals results neither in anæmia, granular corpuscles, nor increased fragility. Indeed, the resistance of the red blood corpuscles is always normal or increased. Here, then, is a similar phenomenon produced primarily by a soluble toxic substance, and while in many instances in the human being, no such cause is apparent, in other cases, such as those occurring in malaria, syphilis and uncinariasis, the primary action of some circulating toxic substance would appear to be certain. It may be, as suggested by Widal, that the marrow, constantly called upon, ends by producing corpuscles less resistant than the normal. But under such circumstances we must fancy that some poisons have acted primarily on blood or marrow. What these may be we know not. The fever associated with paroxysmal aggravations in some cases of acquired hæmolytic jaundice is suggestive of an infection.

It is possible, then, that the corpuscular fragility as well as the granular corpuscles, the main stigmata of the syndrome, may sometimes be secondary to the action of some circulating toxic substance or substances.

Treatment.—Various essays have been made in the treatment of both congenital and acquired hæmolytic jaundice. Widal and his pupils have shown clearly that the persistent administration of iron is the one method from which good results may be obtained. In the severe acquired forms rest in bed and the other adjuvants suitable for the treatment of any grave anæmia should be adopted. In congenital hæmolytic jaundice recovery is unknown, but a temporary improvement in the anæmia may be obtained by persistent treatment with iron. In acquired hæmolytic jaundice long continued treatment may result in apparent, perhaps, indeed, in complete recovery (Widal, Abrami and Brulé). This is a very important fact when one reflects upon the futility of treatment with iron in Addisonian anæmia, a malady which may so closely resemble this syndrome.

* * * * *

The studies, then, of the last several years have brought out a fairly definite clinical syndrome, that of acholuric jaundice associated with splenomegaly and fragility of the red blood corpuscles. In its purest form this group of symptoms is manifested in a sharply defined disease picture, congenital, often familial splenomegalic jaundice. It is probable that many of Gilbert's cases of chronic simple jaundice with splenomegaly as well as of Hayem's infectious splenomegalic jaundice are examples of the disease.

A similar condition is, however, not infrequently met with in adult life. In these so-called acquired cases the symptoms are usually considerably more acute and severe than in the congenital malady.

The syndrome has, moreover, been found in a variety of other instances of non-obstructive jaundice associated with various infections or poisons.

What the essential primary element in these cases may be is not at present clear.

Most important for the moment is the recognition of those apparently idiopathic examples of acquired hæmolytic jaundice simulating pernicious anæmia, cholelithiasis, the so-called splenic anæmias, or, indeed, *icterus gravis*—most important because of the fact that the recognition and persistent treatment of some of these cases with iron may bring about a great improvement, and, perhaps, a permanent recovery.

The recognition of this syndrome has opened up again, and in an interesting manner, the question as to the possibility of a purely hæmatogenous jaundice.

The methods of studying the corpuscular resistance necessary for the diagnosis of such cases are, of course, too delicate for use by the busy practitioner, but they may be carried out easily in any well-equipped laboratory. One may hope that a re-investigation of some of the many instances of non-obstructive jaundice by means of these methods of study may help to shed further light upon an interesting field of medicine.

LITERATURE.

Abrami, P.
Nouveau cas d'ictère hémolytique congénital et familial. Bull. et mém. Soc. méd. d. hôp. de Par., 1908, 3. s., xxvi, 329-335.
Arkwright, J. A.
Family group of cases of enlarged liver and spleen with jaundice. Edinb. M. J., 1903, n. s., xiii, 52-54.
Armand-Delille et Feuillié.
Anémie splénomégalique avec fragilité globulaire. Bull. et mém. Soc. méd. d. hôp. de Par., 1909, 3. s., xxvii, 266-271.
Barlow, Sir T., and Shaw, B.
Inheritance of recurrent attacks of jaundice and of abdominal crises with hepato-splenomegaly. Trans. Clin. Soc., Lond., 1902, xxxv, 155-163; also Med. Press and Circular, 1902, lxxiii, 564.
Barton, W. M.
Acquired hæmolytic ictero-anæmia; Widals' syndrome. Am. J. M. S. 1910, cxl, 239-246.
Basile, G.
Gli itteri emolitici e l'infezione sifilitica. Il Policlinico, 1909, prat., 1291. (Summary of the article of Gaucher and Giroux.)
Bénech, E., et Sabrazès, J.
Ictère hémolytique chronique avec splénomégalie. Gaz. hebd. d. méd. de Bordeaux, 1909, xxx, 469-472.
Benjamin, E., and Sluka, E.
Über eine chronische mit Ikterus einhergehende Erkrankung des Berl. klin. Wchnschr., 1907, xliv, 1065-1069.
Bernard, L.
À propos de l'origine syphilitique des ictères splénomégaliques. et mém. Soc. méd. d. hôp. de Par., 1908, 3. s., xxv, 158.
Bernard, L., et Troisier, J.
Sur un cas d'intoxication saturnine avec méningite, anémie et Bull. et mém. Soc. méd. d. hôp. de Par., 1908, xxv, 3. s., 753-762.
Bettman.
Über eine besondere Form chronischen Ikterus. Muenchen. Wchnschr., 1900, xlvii, 791.
Bigart.
Les ictères hémolytiques. J. de méd. int., Par., 1909, xiii, 24-23.
Brulé, M.
Les ictères hémolytiques acquis. Thèse de Paris, 1909, nº 88 full table of references).
Bué, V.
Les ictères du nouveau-né. Gaz. d. mal. infant. (etc.), Par., x, 185-190.
Burgerhof.
Congénitale familiaire icterus. Geneesk. Bl. u. Klin. en Lab. prakt. Haarlem, 1907-8, xiii, 241-266.
Cade.
Une famille d'ictériques; cholémie familiale et ictères hémolytiques Bull. et mém. Soc. méd. d. hôp. de Par., 1908, 3. s., xxv, 421-429.
Cade and Chalier.
Ictère hémolytique et cholémie familiale. Lyon méd., 1908, cxi, 930-937
Campani, A., e Ferrari, G.
Sopra un caso d'ittero cronico infantile. Clin. Med., ital., 1908, 394-407.
Caporali, L.
I. Anemia splenica infantile. II. Ittero cronico congenito. Med. ital. Napoli, 1905, iii, 373-375.
Castaigne, J.
Le foie et le fer. Leurs rapports à l'état pathologique. Presse méd. Par., 1906, xiv, 771; 785.
Les ictères hémolytiques avec sidérose pigmentaire du foie. Bull. et mém. Soc. méd. d. hôp. de Par., 1907, 3. s., xxiv, 1211-1216.
Chronique. J. méd. franç., 1910, iv, 95.
Les ictères hémolytiques. J. méd. franç., 1910, iv, 101-109.
Cathala et Daunay.
Les hématies granuleuses, la résistance globulaire à la naissance et pendant les premiers jours. Compt. rénd. Soc. de biol., Par., 190 lxiv, 801-803.
Recherches sur le sang et l'ictère simple du nouveau-né. Obstétrique Par., 1908, n. s., i, 561-604.
Chalier, J.
Les ictères hémolytiques. 8°, Lyon, 1909. Thèse. (With an admirable table of references to the literature.)
Chauffard, A.
Maladies du foie, in Traité de méd. (Charcot, Bouchard, Brissaud Par., 1892, iii.
Ictère chronique dyspéptique avec cholurie minime et intermittente Choluries sans ictère. Bull. et mém. Soc. méd. d. hôp. de Par., 1901, 3. s., xviii, 444-449.
Pathogénie de l'ictère congénital de l'adulte. Semaine méd., Par., 1907, xxvii, 25.
Chauffard et Rendu.
La résistance globulaire normale chez l'adulte. Presse méd., Par., 1907, xv, 345.
Chauffard et Fiessinger, N.
Ictère congénital hémolytique avec lésions globulaires. Bull. et mém. Soc. méd. d. hôp. de Par., 1907, 3. s., xxiv, 1169-1184.
Recherches expérimentales sur les rapports entre l'hémolyse et les hématies granuleuses. Bull. et mém. Soc. méd. d. hôp. de Par., 3. s., xxiv, 1367-1373.
Nouvelles recherches sur la genèse des hématies granuleuses. Compt. rend. Soc. de biol., Par., 1907, lxiii, 672.
Chauffard, A.
Les ictères hémolytiques. Semaine méd., Par., 1908, xxviii, 49-52; also Rev. gén. de clin. et de thérap., Par., 1908, xxii, 84.
Ikterus hæmolyticus. Allg. Wien. med. Ztg., 1908, liii, 462.
Chauffard, A., et Troisier, J.
Deux cas d'ictère hémolytique. Bull. et mém. Soc. méd. d. hôp. de Par., 1908, 3. s., xxv, 411-420.
Contribution à l'étude des hémolysines dans leur rapport avec les anémies graves. Bull. et mém. Soc. méd. d. hôp. de Par., 1908, 3. s., xxvi, 94-105.
Des rapports de certaines anémies splénomégaliques avec l'ictère hémolytique congénital. Bull. et mém. Soc. méd. d. hôp. de Par., 1909, 3. s., xxvii, 293.
Claisse et Socquet.
Insuffisance mitrale traumatique. Asystolie. Gangrène des membres. Ictère hémolytique. Bull. et mém. Soc. méd. d. hôp. de Par., 1908, 3. s., xxv, 769-773.

and KALBERLAH.
Über chronischen Ikterus. Berl. klin. Wchnschr., 1906, xliii, 1471-1474.

OCKING, W. T.
A case of persistent jaundice of fifty years' standing. Quarterly Med. J., Sheffield, 1903, xi, 104.

ONNER, L. A., and ROPER, J. C.
The relations existing between bilirubinemia, urobilinuria, and urobilinemia. Tr. Ass. Am. Phys., Phila., 1908, xxiii, 222-245.

ARRÉ, H.
Sur un cas d'anémie ankylostomiasique avec fragilitié globulaire et ictère hémolytique. Bull. Soc. path. exot. Par., 1909, ii, 97-101.

HNI et ALEXIEFF.
De la résistance des globules déplasmatisées dans l'anémie. Compt. rend. Soc. de biol. Par., 1908, lxiv, 1101.

TIENNE, G.
Sur un cas probable d'ictère hémolytique. Rev. méd. de l'est., Nancy, 1909, xli, 548-551.

ERRATA, A.
Über die klinische und morphologische Bedeutung der vitalfarbbaren Substanz und die basophile Punctirung der Erythrocyten. Fol. hæmatolog., Leipz., 1910, ix, I Th., 253-277.

UILLIÉ, E.
Hémolyse, flux leucocytaires et ictère. Compt. rend. Soc. de biol., Par., 1908, lxv, 626-628.

ESSINGER, N., et ABRAMI, P.
Les hématies à granulations; procedés de coloration, valeur séméiologique. Revue de méd., Par., 1909, xxix, 1-40.

OIN, G.
L'hématolyse anormale. Compt. rend. Soc. de biol., Par., 1906, lxviii, 10-12.

NDY et BRULÉ, P.
Ictère hémolytique congénital, autopsie. Bull. et mém. Soc. méd. d. hôp. de Par., 1909, 3. s., xxviii, 369-375.

UCHER et GIROUX.
Note préliminaire sur l'ictère hémolytique de la syphilis secondaire. Ann. d. mal. vén., Par., 1909, iv, 481-482.

UCHER, E., et JOLTRAIN.
Purpura chronique de l'angiosclérose. Urobiligénie hémolytique locale. Urobilinhémie et urobilinurie. J. de méd. int., Par., 1909, xii, 275-277.

HARDT.
Die Pathogenese des Ikterus. Muench. med. Wchnschr., 1905, lii, 889-392.

BERT, LEREBOULLET et HERSCHER.
Les trois cholémies congénitales. Bull. et mém. Soc. méd. d. hôp. de Par., 1907, 3. s., xxiv, 1203. (With abundant references to the literture.)

BERT et LEREBOULLET.
a cholémie simple familiale. Son importance en pathologie. J. méd. ranç., Par., 1910, iv, 110.

GEROT et SALIN, H.
ctère hémolytique acquis général et purpura avec ictère hémolytique ocal, au cours d'une infection indéterminée. Arch. d. mal. du cœur etc.), Par., 1910, iii, 720-729.

LAIN, G., et TROISIER, J.
hysiologie pathologique de l'hématome pleural traumatique. La ligénie hémolytique locale. Semaine méd., Par., 1909, xxix, 133.
ontribution à l'étude des ictères hémolytiques locaux. Rev. de méd., ar., 1909, xxix, 459.

KINS, C. P., and DUDGEON, L. F.
ongenital family cholæmia. Quart. J. Med., Oxford, 1908-9, ii, 165-177.

EM, G.
ir une variété particuliere d'ictère chronique, ictère infectieux chroque splénomégalique. Presse méd., Par., 1898, vi, 121-125.
uvelle contribution à l'étude de l'ictère infectieux chronique splénogalique. Bull. et mém. Soc. méd. d. hôp. de Par., 1908, 3. s., xxv, 2-138.

HISON, R.
mily jaundice. Clin. J. Lond., 1909, xxxiv, 241-244.

HISON, R., and PANTON, P. N.
contribution to the study of congenital family cholæmia. Quart. Med., Oxford, 1908-9, ii, 432-437.

ESCO, H., et SALIGNAT.
fragilité globulaire varie-t-elle suivant que l'on opère sur le sang briné, fluoré ou exalté? Compt. rend. Soc. de biol., Par., 1907, i, 778.

F. H.
oluric Jaundice. Proc. Roy. Soc. Med., 1910, iii (Clinical Section),

et LÉVY-VALENSI.
nouveau cas d'ictère hémolytique congénital. Bull. et mém. Soc. l. d. hôp. de Par., 1909, 3. s., xxvi, 219.

G.
ro emolitico della tuberculosi e funzione emolitica del fegato. Riv. eta di sc. med., Venezia, 1909, i, 3-19.

J. H., and STEWART, H. A.
ct of the injection of bile on the circulation. J. Exper. Med., N. Y.,), xi, 673.

NHALS.
congenitalen Icterus mit kronischen Milztumor. Deutsches Arch. in. Med., Leipz., 1904, lxxxi, 596-612.

LANDOUZY, L.
Anémie et ictère hémolytiques tuberculeux. Bacillo-tuberculose hémolysante, anémie grave et subictère, par fragilité globulaire chez un phthisique pulmonaire. Presse méd., Par., 1910, xviii, 761.

LE GENDRE, P.
Ictère urobilinique chronique (durant depuis douze ans) chez un jeune homme de dix huit ans. Bull. et mém. Soc. méd. d. hôp. de Par., 1897, 3. s., xxiv, 457-459.

LE GENDRE et BRULÉ.
Deux observations d'ictères hémolytiques, l'un congénital, l'autre acquis. Bull. et mém. Soc. méd. d. hôp. de Par., 1909, 3. s., xxvi, 112-124.

LEMIERRE, A., et ABRAMI, P.
L'ictère pneumococcique. Presse méd., Par., 1910, xviii, 82.

LE PLAY, A.
Cirrhose hypertrophique alcoolique avec ictère hémolytique et hémorrhagies intestinales à evolution aiguë, examen nécroscopique. Bull. Soc. anat., Par., lxxxiv, 552-556.

LEURET, E.
Étude sur quelques cas d'ictère des nouveaux-nés. Thèse de Bordeaux, 1904.
Remarques sur la pathogénie de l'ictère des nouveau-nés. Phénomènes d'hématolyse. Folia hæmatol., Berl., 1906, iii, 81.
Étude sur la résistance globulaire nouveau-né envisagée spécialement dans ses rapports avec l'ictère idiopathique. Gaz. hebd. d. Soc. méd. de Bordeaux, 1908, xxix, 147-150.
État du sérum sanguin chez le nouveau-né à l'état normal. dans l'ictère idiopathique et dans l'ictère biliphéique. Compt. rend. Soc. de biol., Par., 1908, lxiv, 691-692.
À propos de la pathogénie de l'ictère du nouveau-né. Obstétrique, Par., 1909, xiv, 142-146.
Étude anatomo-pathologique comparée de l'ictère hémolytique du nouveau-né et de l'hémolyse provoquée. Nature hémolytique de l'ictère post-chloroformique. Arch. d. mal. du cœur (etc.), Par., 1910, iii, 236-253.

LORTAT-JACOB, L., et SABARÉANU, G.
Deux observations de l'ictère chronique familial. Rev. de méd., Par., 1904, xxiv, 810-818.

MARCHIAFAVA, E., et NASARI, A.
Sugli itteri emolitici. Bull. d. r. Accad. med. di Roma, 1909, xxxv, 152-161.

MASON.
Case of congenital jaundice in a girl aged 13. Quart. med. J., Sheffield, 1902-3, xi, 40-41.

MASSAGLIA, A., et TARABINI, L.
Contributo alla patogenesi dell'ittero da emolisi. Gazz. d. osp., Milano, 1908, xxix, 1655-1657.

MICHELI, F.
Note istologiche su di un caso di splenomegalia con ittero acholurico cronico acquisito. Gior. d. r. Accad. di med. di Torino, 1909, 4. s., xv, 213-220; also Path. rev. quindicen., Genova, 1908-9, i, 517-522.

MINKOWSKI.
Über eine hereditäre, unter dem Bilde eines chronischer Ikterus mit Urobilinurie, Splenomegalie und Nierensiderosis verlaufende Affection. Verhandl. d. Cong. f. inn. med., Wiesb., 1900, xviii, 316.
Ikterus u. Leberinsufficienz. Deutsche Klinik, Berl. u. Wien, 1905, v, 651-686.

MÖLLER, S.
Über chronischen acholurischen Ikterus mit Splenomegalie. Berl. klin. Wchnschr., 1908, xlv, 1639-1643.

MOUSSOUS, A.
De la pathogénie de l'ictère idiopathique du nouveau-né (érythrodermie ictérogène). Provence méd., Par., 1908, xix, 227-230.

MURCHISON, C.
Diseases of the liver. 3d ed., 1885, 481.

OETTINGER, W.
Sur un cas d'ictère d'origine hémolytique non congénital; étude des lésions anatomiques. Bull. et mém. Soc. méd. d. hôp. de Par., 1908, 3. s., xxv, 391.

PARSONS, L. G.,
Congenital acholuric jaundice. Proc. Roy. Soc. Med., 1910, iii, Section for the study of disease in children, 136-137.

PÉJU, G.
Ictères familiaux et leur mécanisme morbide. Loire méd., St. Etienne, 1908, xxvii, 117-125.

PICK, A.
Über hereditären Ikterus. Wien. klin. Wchnschr., 1903, xvi, 493.

PLEHN, A.
Familiäre Milz- und Leber-vergrösserung mit Anaemie und gutartigen Verlauf. Deutsche med. Wchnschr., 1909, xxxv, 1749-1751.

POLLAK, R.
Fall von chronischen familiären acholurischen Ikterus. Mitth. d. Gesellsch. f. inn. Med. u. Kinderheilk. in Wien, 1908, vii, 92-94.

POYNTON, F. J.
A clinical lecture on congenital family cholæmia or recurrent family jaundice. Lancet, 1910, i, 153-156.

QUENU, E., et KUSS, G.
Notes sur les ictères postchloroformiques. Bull. et mém. Soc. de chir. de Par., 1908, n. s., xxxiv, 1108-1110.

RENAUX, E.
Un cas d'ictère hémolytique congénital. Presse méd. Belge, Brux., 1909, lxi, 711-713.

Ribierre, P.
L'hémolyse et la mesure de la résistance globulaire. Application à l'étude de la résistance globulaire dans l'ictère. Thèse, Par., 1902-3.

Rist, E., et Ribadeaux-Dumas, L.
La splénomegalie liée à l'ictère et l'immunité acquise contre l'intoxication biliare. Tribune méd., Par., 1905, n. s., xxxviii, 421-425.

Rolleston, H. D.
Diseases of the liver, etc. London, 1905.

Roque, G., Chalier, J., et Nové-Josserand.
Ictère hémolytique acquis. Prov. méd., Par., 1909, xx, 367-368.

Roque, G., Chalier, J., et Nové-Josserand.
Ictère hémolytique acquise à type ictère grave. Lyon méd., 1909, cxiii, 961-965.

Rosenfeld, R.
Über familiären Ikterus. Deutsche med. Wchnschr., Leipz. u. Berl., 1909, xxxv, 616-621.

Rossi, G.
Contributo alla conoscenza degli itteri congeniti emolitici. Tommasi, Napoli, 1909, iv, 197-201.

Sabrazès, J., et Leuret, E.
Hématies granuleuses et polychromatophilie dans l'ictère des nouveau-nés. Gaz. hébd. d. soc. méd. de Bordeaux, 1908, xxix, 123.

Sabrazès, J., et Muratet, L.
Cellules endothéliales hémato-macrophages dans le liquide cephalo-rachidien coloré, symptomatiques de l'hémorrhagie méningo-encéphalique. Compt. rend. Soc. de biol., Par., 1903, lv, 912-913.

Sacquépée, E.
Ictères hémolytiques d'origine paludéene. Bull. et mém. Soc. méd. d. hôp. de Par., 1908, 3. s., xxvi, 361-369; also Bull. méd., Par., 1908, xxii, 937-939.
Ictère grave stréptococcique; formule sanguine des ictères hémolytiques acquis, avec reaction granuleuse retardé. Bull. et mém. Soc. méd. d. hôp. de Par., 1909, 3. s., xxvi, 164-171.

Starkiewiez, W.
Sur la pathogénie de l'ictère acholurique congénital. Rev. de méd., Par., 1909, xxix, 61-75.

de Stefano, S.
Un caso de itterizia congenita. Pediatria, Napoli, 1909, 2. s., vii, 217-221.

v. Stejskal.
Über haemolytischen Ikterus und über das Auftreten haemolytischer Vorgänge bei diesem und bei perniciöser Anaemie. Wien. klin. Wchnschr., 1909, xxii, 661-667.
Mitt. d. Gesellsch. f. inn. Med. u. Kinderheilk. in Wien, 1908, vii, 221-229. (Brief note.)

Strauss, H.
Über erworbene Formen des chronischen acholurischen Ikterus mit Splenomegalie. Berl. klin. Wchnschr., 1906, xliii, 1590-1593.
(Remarks à propos of Möller's case.) Berl. klin. Wchnschr., 1908, xlv, 1643.

Tileston, W., and Griffin, W. A.
Chronic family jaundice. Am. J. M. Sc., Phila., 1910, cxxxix, 847-869. (With excellent table of references.)

Tixier, L.
Ictère d'origine hémolytique. Résistance des hématies déplasmatisées sensiblement normale. Compt. rend. Soc. de biol., Par., 1908, lxiv, 43-44.
Réactions de la moelle osseuse dans uns cas d'ictère hémolytique. Compt. rend. Soc. de biol., Par., 1908, lxiv, 108-109.

Treves, F.
A case of jaundice of sixteen years' standing. Practitioner, 1899, lxii, 18-20.

Troisier, J.
Ictère et urobilinhémie hémolytiques au cours de la pneumonie. Compt. rend. Soc. de biol., Par., 1909, lxvii, 46-47.
Urobilinhémie d'origine hémolytique. Compt. rend. Soc. de biol., Par., 1909, lxvi, 739-740.
Physiologie pathologique de l'hématome pleural traumatique; la biligénie hémolytique locale. Semaine méd., Par., 1909, xxix, 133-138.
Rôle des hémolysines dans la genèse des pigments biliaires et de l'urobiline, 4°, Par., 1910. Thèse.

Vaquez, H.
Des modifications du volume des hématies au cours de l'ictère. Compt. rend. Soc. de biol., Par., 1902, liv, 975-977.

Vaquez, H., et Ribierre, P.
De la résistance du sang au cours de l'ictère. Compt. rend. Soc. de biol., Par., 1902, liv, 1074-1076.

Vaquez, H., et Giroux.
Ictère chronique acholurique avec splénomégalie. Ses rélations avec l'anémie hémolytique. Bull. et mém. Soc. méd. d. hôp. de Par., 1907, 3. s., xxiv, 1184.

Vaquez, H., et Aubertin, Ch.
Sur l'anatomie pathologique de l'ictère hémolytique. Arch. d. mal. du coeur (etc.), Par., 1908, i, 609-623.

Vaughan, V. C., Jr.
On the appearance and significance of certain granules in the erythrocytes of man. J. Med. Research, Bost., 1903-4, x, 342-366.

Weber, F. Parkes.
Acquired chronic acholuric jaundice, with a blood picture at one time resembling that of pernicious anæmia. Am. J. M. Sc., Phila., 1909, n. s., cxxxviii, 24.
Congenital familial splenomegaly with chronic acholuric jaundice. Proc. Roy. Soc. Med., Lond., 1909, ii, Pt. I, Clin. Sec., 117.

Weber, F. P., and Dorner, G.
Congenital acholuric so-called hæmolytic jaundice in one family. Lancet, Lond., 1910, i, 227; also Vier Fälle von congenitalen acholurischem (sogenanten haemolytischen) Ikterus in einer Familie. Fol. haematolog., Leipz., 1910, ix, I Th., 528-533.

Widal, F., et Ravaut, P.
Ictère chronique acholurique congénital chez un homme de 29 ans. Augmentation passagère et legère du foie et de la rate. Parfait état de santé générale. Bull. et mém. Soc. méd. d. hôp. de Par., 1902, 3. s., xix, 984-990.

Widal, F., et Philibert, A.
La fragilité globulaire chez certains ictériques congénitaux. Gaz. d. hôp., Par., 1907, lxxx, 1275.

Widal, F., Abrami P., et Brulé, M.
Types divers d'ictères hémolytiques. La recherche de la résistance globulaire par le procédé des hématies déplasmatisées. Bull. et mém. Soc. méd. d. hôp. de Par., 1907, 3. s., xxiv, 1127.
Différentiation de plusieurs types d'ictères hémolytiques par le procédé des hématies déplasmatisées. Presse méd., Par., 1907, xv, 641.
Hémolyse par fragilité globulaire et hémolyse par action plasmatique. Compt. rend. Soc. de biol., Par., 1907, lxiii, 346-349.

Widal, F., et Abrami, P.
Types divers d'ictères hémolytiques non-congénitaux avec anémie. Recherche de la résistance globulaire par le procédé des hématies déplasmatisées. Tribune méd., Par., 1907, n. s., xxxix, 711.

Widal, F., Abrami P., et Brulé, M.
Pluralité d'origine des ictères hémolytiques. Bull. et mém. Soc. méd. d. hôp. de Par., 1907, 3. s., xxiv, 1354-1367.
Diversité de types des hématies granuleuses; procédés de coloration. Compt. rend. Soc. de biol., Par., 1908, lxiv, 496-499.
Les ictères d'origine hémolytique. Arch. d. mal. du cœur (etc.), Par., 1908, i, 193.
Auto-agglutination des hématies dans l'ictère hémolytique acquis. Compt. rend. Soc. de biol., Par., 1908, lxiv, 655-657.
Rétrocession des symptomes cliniques et des troubles hématiques au cours des ictères hémolytiques acquis. Bull. et mém. Soc. méd. d. hôp. de Par., 1909, 3. s., xxviii, 73-85.

Widal, F., et Joltrain.
Ictère hémolytique dévellopé au cours d'une anémié post hémorrhagique. Bull. et mèm. Soc. méd. d. hôp. de Par., 1908, 3. s., xxv, 468-474.
Biligénie hémolytique locale dans l'hémorrhagie méningée. Compt. rend. Soc. de biol., Par., 1909, lxvi, 927-930.

Widal, F., and Bénard.
Biligénie hémolytique localisée à la peau sur de larges plaques d'érythème noueux sans extravasation sanguine. Compt. rend. Soc. de biol., Par., 1909, lxvi, 950.

Wilson, C.
Some cases showing hereditary enlargement of the spleen. Trans. Clin. Soc., Lond., 1890, xxiii, 162.

Wilson, C., and Stanley, D.
Sequel to some cases showing hereditary enlargement of the spleen. Trans. Clin. Soc., Lond., 1893, xxvi, 163-171.

NOTES ON NEW BOOKS.

Dispensing Made Easy. By Wm. G. Sutherland, M. B., revised by F. J. Warwick, M. B. (*Bristol: John Wright & Sons, 1910.*)

This little work contains a great deal of information especially valuable to the physician who does his own dispensing and to the pharmacist of a hospital or dispensary. There are directions for convenient ways of preparing many solutions and combinations of drugs. A number of formulas are given, many of which are taken from the pharmacopeias of the London hospitals. The book contains many practical points, and for the young practitioner it should prove a useful aid in mastering many of the practical details of prescribing.

Nurses' Handbook of Drugs and Solutions. By Julia C. Stimson, R. N., Superintendent of Nurses Harlem Hospital, of Bellevue and Allied Hospitals, New York City. Price $1.00. (*Boston: Whitcomb & Barrows, 1910.*)

It is very difficult to write a good textbook for nurses, and this one should, it seems to us, be merely used as a reference book, like a quiz compend. Too much has been crowded into it, and certain sections should either be omitted, or given in greater detail (*e. g.*, Part V, on Antitoxins, Vaccines, and Sera, with their uses). Such a sentence as the following will not be easily grasped by pupil nurses: "The only real success in securing pro-

the cure of diseases produced by micro-
ganisms, is now known to be based upon the artificial direction
the body's own immunizing ability, by means of removing ob-
acles to its action, of furnishing the appropriate stimulus when
ich is lacking, or by the addition to the blood stream of specific
ibstances, which the body itself produces, but not in sufficient
antity to be effective in the production of a state of immunity
gainst the infection under which it is struggling" (p. 68).
ome of the "Rules for Solutions" are not expressed as clearly
might be, and in some places the metric system is used, and in
hers the apothecaries'. The value for nurses of such prescrip-
ons as are given under "Common Formulæ" is problematic, to
y the least.

awn of the Fourth Era in Surgery and Other Short Articles Previously Published. By ROBERT T. MORRIS, A. M., M. D., etc.

The author's many friends and admirers, as well as other stu-
nts of surgery, will be pleased to have this collection of his
pers in a neat and attractive form. Naturally all will not agree
ith Dr. Morris' dicta on certain surgical points, but his views
serve consideration, and an hour can be well spent rereading
ese articles, which deal with the use of the rubber glove, the
pendix, the gall bladder, rapidity of operation, etc.

inciples of Therapeutics. By A. MANQUAT, National Correspondent to the Académie de Médicine. Translated by M. SINBAD GABRIEL, M. D. Price, $3.00. (*New York and London: D. Appleton & Co., 1910.*)

In this book the author discusses the general principles that
iderlie the giving of medicines, and the use of other therapeutic
ents. It is dedicated to "young physicians," and "every line
it is devoted to *practice*, with the double object of being useful
d doing no harm." It is divided into the following twelve chap-
rs: I. Views of the Various Manners of Conceiving Therapeu-
s; II. The Forms of Therapeutic Action; III. Of the Action of
edicines; IV. Doses; V. Medicinal Opportunity; VI. Primum
n Nocere! VII. The Elements of Therapeutic Individualiza-
n; VIII. Influence of Environment on Therapeutic Results;
Variations of Therapeutic Activity Inherent in Medicines;
Non-medicinal Therapeutic Actions; XI. Method in Therapeu-
, and XII. Division of Therapeutic Agents. Much good advice
given, but it is not always presented in the happiest form; the
hor's style is not so lucid as that of many French writers, but
se who have time to read this rather diffuse work will benefit
mselves. Such clumsy and un-English words as "hypostheni-
ts," "hyposthenizing," "thermality," "nosocratic," "stom-
al" and others mar the text, and the translation of many of
sentences is too literal and awkward. The definition of dis-
(p. 58) as "*the disturbance of the habitual organic equilib-
n by the fact of an abnormal force acting with sufficient in-
ity to modify the fixity of its reactions, the habitual play of
functions and at times its structure and chemical composition,
giving rise to disorders which persist until the accomplish-
t by this living matter of elimination or destruction of the
ifying cause or else its own adaptation to the presence of the
urbing force*," may be intelligible in French, but is not readily
prehensible as it stands. "Nutritive movement" (p. 147) for
stion is not happy. In spite, however, of these defects in its
lish form, the book has value.

natomical and Surgical Study of Fractures of the Lower End of the Humerus. By ASTLEY PASTON COOPER ASHHURST, B., M. D., etc. The Samuel D. Gross Prize Essay of the hiladelphia Academy of Surgery, 1910. (*Philadelphia and ew York: Lea & Febiger, 1910.*)

strated by case histories and excellent photographs and
graphs, this is a valuable monograph, one which every surgeon who sees many fractures will find helpful. The understanding of these fractures has been made clearer by Dr. Ashhurst's experimental and anatomical work. That the study is thorough is shown by the contents which include Introduction, Anatomy, Development of the Lower Epiphysis of the Humerus, Classification, Pathogenesis, Examination of the Patients, Supracondylar Fractures, Transverse, Diacondylar Fractures, Fractures of the External Condyle, Fractures of the Epitrochlea, Epiphyseal Separations, Fractures of the Internal Condyle, Intercondylar Fractures, Complications, Dressing the Elbow in Hyperflexion, Results, and Clinical Histories. The winning of the Samuel D. Gross Prize marks the distinction of this piece of work.

An Introduction to Surgery. By RUTHERFORD MORISON, M. A., M. B., F. R. C. S., Edin. and Eng., etc. Illustrated. Price, 8/6. (*Bristol: John Wright & Sons, Ltd. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd., 1910.*)

This work of about 150 pages is divided into ten chapters as follows: (1) Inflammation, (2) Bacteria, (3) Ulcers, (4) Gangrene, (5) Syphilis, Tubercle, and Malignant Disease, (6) Hæmophilia, (7) Wounds, (8) Abdominal and Pelvic Viscera, (9) Indications for Operation, (10) X-rays. It is difficult to understand for whom such a work is intended. Much of the teaching is puerile—it is like a book written in words of one syllable. Students who are not able to grasp more in an Introduction to Surgery, should not begin to study surgery. One poor paragraph on "Leucocytosis," and less than two pages on "Gonorrhœa" should not be considered as proper education to any class of students at any time in their career. Such a book is not really helpful to anyone. It is much too diagrammatic and epigrammatic.

Anæmia. By DR. P. EHRLICH and DR. A. LAZARUS. Part 1. Volume 1. Normal and Pathological Histology of the Blood. Second Edition. (Enlarged and to a great extent rewritten). By DR. A. LAZARUS and DR. O. NAEGELI. Translated for the German by H. W. ARMIT, M. R. C. S., L. R. C. P. (London). Illustrated. Price, $4.00. (*New York: Rebman Company, 1910.*)

The new edition of this well-known work will be welcome to all hæmatologists and clinicians. Ehrlich's studies of the blood are fundamental, and every student of this branch of medicine must be acquainted with them. This translation will, therefore, be of great help to those who are unable to read the original book in German. It is divided into four chapters. Chapter 1, Introduction; Definition—Clinical Methods of the Examination of Blood; and Chapter II, The Morphology of the Blood, are by Dr. Lazarus; Chapter III, The White Blood Corpuscles, by Dr. Naegeli; and Chapter IV, The Blood Platelets: The Hæmoconia, by Dr. Lazarus.

Applied Anatomy. The Construction of the Human Body Considered in Relation to Its Functions, Diseases and Injuries. By GWILYM G. DAVIS, M. D., Associate Professor of Applied Anatomy, University of Pennsylvania, etc. With 630 illustrations, mostly from original dissections and many in color, by Erwin F. Faber. (*Philadelphia and London: J. B. Lippincott Company.*)

Any thorough work which will aid the medical student to overcome the feeling that anatomy is a dull, dry subject, and has little practical relation to medicine, is welcome, and he who, along with his Gray, will read his Davis, will find that, after all, human anatomy is a living subject, and will be helped through many a tedious hour. The aim of the author "is to show the relation of structure to function" in both normal and pathological conditions, and with a clear text and abundance of illustrations, he has produced a really valuable book, which can be said of very few modern medical works. The book is intended not alone for students, but surgeons and physicians will often find occasion to turn to its pages for information or the solution of some difficult problem. It is well arranged, and satisfactory in every way, except for its weight, excusable only by the handsome paper used.

Clinical Pathology in Practice, with a Short Account of Vaccine Therapy. By Thomas J. Horder, M. D., R. R. C. P., etc. Price, $3.00. (*London: Henry Frowde* and *Hodder & Stoughton, 1910.*) Oxford Medical Publications.

"The aim of this book is to present the practitioner with a brief survey of the scope and usefulness of modern pathological methods as applied to the diagnosis and treatment of disease. It is not intended to serve as a laboratory text-book . . . ." Such is the limitation of the book that many another laboratory text-book along these same lines is more useful to the student, since the practice of clinical pathology should go hand in hand with the theory of its use. After three preliminary chapters (Introductory, The Collection of Materials, Blood Culture) the author takes up The Histological Examination of the Blood, The Sputum, Pleural, Lung, Lumbar and Joint Puncture, Infective Conditions of the Nose, Mouth, Throat, and Urinary Tracts, Examination of the Fæces, the Diagnosis of Tuberculosis and Its Specific Treatment, Certain Specific Serum Tests and Their Value in Diagnosis, Fever without Other Physical Signs, and Vaccine Therapy. Simply and only as an introduction to the further study of these subjects can this book serve a purpose, and that rather inadequately.

A Manual of Nursing. By Margaret Frances Donahoe, formerly Superintendent of Nurses and Principal of Training School, Philadelphia General Hospital. Illustrated. (*New York and London: D. Appleton & Co., 1910.*)

This "Manual" covers all nursing and, therefore, is more complete than some of the treatises on this subject. On the whole, it is satisfactory, but it lacks distinction. The difference between a primary text-book on medicine and a treatise on nursing is not kept clearly in mind by the authoress, and this detracts from the value of the book, for some of her remarks in the chapter on the nursing of contagious diseases are not always correct. Throughout the work there are statements which need revision, but there are few errors of real consequence, and nurses will not be led far astray in reading this book, though they could spend their time better on some others.

International Clinics. Edited by Henry W. Cattell, A. M., M. D., with collaborators. Vol. IV. Twentieth Series, 1910. (*Philadelphia and London: J. B. Lippincott Company.*)

This volume opens with a timely article on "606" by the editor. It is important that the value and use of this new remedy should be thoroughly understood by the profession, and this article will be of material aid. Dr. J. J. Walsh has written another one of his entertaining and instructive historical papers on the "Physicians' Fees Down the Ages," and there are numerous other clinics on "Diagnosis and Treatment," "Medicine," "Surgery," "Neurology," "Pathology," "Ophthalmology," "State Medicine," and "Postgraduate Course," which will please and satisfy a variety of readers.

Studies in Invalid Occupation. A Manual for Nurses and Attendants. By Susan C. Tracy. Price, $1.50. (*Boston: Whitcomb & Barrows, 1910.*)

This is an excellent and most helpful work for the classes to whom it is addressed. The descriptions of objects to be made by the patients are clear, and there are a number of photographs and drawings which are also useful. To keep the hands of invalids with mental troubles of one sort and another, occupied is one of the most important means of curing them, and in any case, of preventing their mental condition becoming worse. Manual exercises of all kinds are an excellent means of keeping the minds of normal people healthy, and are still more important for the abnormal, and as an aid to all who care for those with mental disturbances this book can be heartily commended. Few attendants have sufficient imagination or knowledge to get on without a guide of this sort, and the majority will be glad of the assistance to be found in these "Studies."

A System of Syphilis in Six Volumes. Edited by D'Arcy Power, M. B., Oxon., F. R. C. S., and J. Keogh Murphy, M. D. F. R. C. S. With an introduction by Jonathan Hutchinson, F. R. S. Vol. II. (*London: Henry Frowde and Hodder & Stoughton, 1908.*) Oxford Medical Publication.

The editor-in-chief, Dr. D'Arcy Power, opens this volume with an interesting and able paper on the "Surgery of Syphilis," and he is followed by Col. F. J. Lambkin, who contributes two noteworthy papers on "The Treatment of Syphilis," and "An Outbreak of Syphilis in a Virgin Soil." The final chapter on "Syphilis in Obstetrics" is well handled by Dr. William J. Gow. Since the appearance of this volume two years ago the new method of treating syphilis with "606" has been discovered, but this remedy will not altogether drive out of use or supplant the older ones, so that Col. Lambkin's paper on treatment is still well worth reading and studying. There is no doubt that for all students of syphilis this is a most important system, and each volume contains papers of exceptional value. Such experiences as Col. Lambkin had with this disease in Uganda are exceedingly rare and of the greatest interest. The volume is illustrated with some beautiful color reproductions.

American Practice of Surgery. A Complete System of the Science and Art of Surgery. By Representative Surgeons of the United States and Canada. Editors: Joseph D. Bryant, M. D., LL. D.; Alfred H. Buck, M. D. Complete in eight volumes, profusely illustrated. Vol. VI. (*New York: William Wood & Co., 1909.*)

The surgeons, who contribute articles to this volume, are: Armstrong, Elder and Shepherd, of Montreal; Balch, Cabot, Graves and Mosher, of Boston; Carson and Mudd, of St. Louis; Bloodgood, of Baltimore, and Turner, of Philadelphia. Unless one turns to the individual articles there is no means of quickly finding the respective authors, whose names might have readily been placed after the subject headings under "Contents." Bloodgood's paper on the "Surgical Diseases of the Jaws" is separated from other papers on the surgery of the face and throat by a number of papers on the surgery of the female and male genitals. These are minor defects, but in a well-arranged system they would not occur. The very completeness of this sytem leads to redundancy of material. The volume opens with a paper on Prosthesis in its Relation to Surgery of the Face, Mouth, Jaws and Nasal and Laryngeal Cavities, followed in sequence by chapters on Surgical Diseases and Wounds of the Nasal Cavities and Accessory Sinuses; Surgical Diseases and Wounds of the Mouth, Tongue, and Salivary Glands; Surgical Diseases and Wounds of the Neck; Surgical Diseases and Wounds of the Thyroid and Thymus; Surgery of the Thorax and Spinal Column; Surgical Diseases and Wounds of the Female Breast; Surgical Diseases and Wounds of the External Genitals and Vagina of the Female; Surgical Diseases and Wounds of the Male Genital Organs; Chancroid; Gonorrhœal Urethritis, and Surgical Diseases and Wounds of the Jaws. Thus these articles take up 900 pages and the volume is so heavy as to be unwieldy. There are but few references, which seems rather a defect in a classical work of this nature, but the question of mulis a debated one. Many of the drawings and otographs are excellent, but the colored plates are not good. e articles, on the whole, cover the ground well, and the surgeon need of this system will find it a useful book. This volume may said to well uphold the repute already gained by American and nadian surgeons, and while there is no paper of exceptional erit in this volume, the general average of excellence is high.

ydrotherapy. A Work on Hydrotherapy in General, Its Application to Special Affections, The Technic or Processes Employed and the Use of Waters Internally. By Guy Hinsdale, A. M., M. D., etc. Illustrated. Price, $3.50. (*Philadelphia and London: W. B. Saunders Company, 1910.*)

A few years ago the number of text-books on this subject was nited, but they are now constantly increasing in numbers, and ere is no longer any reason why the general practitioner should t have a clear idea of the uses and value of water applied both ternally and externally. The best part of most of these text-oks is the description of the technic in giving the different forms baths and sprays. The authors have a tendency, it seems to us, exaggerate the value of water in many affections, but it must be id that those who do not use hydrotherapy freely do not recog-ze its many values. This work is a smaller one than Kellogg's, d sufficient for the use of the ordinary practitioner. The chap-r on the use of baths in typhoid fever, where correct use of ater is so important, is, however, most unsatisfactory, it is far too brief, and the author should have given a fuller account of their action, and when they should and should not be given.

It is a pity to add to our medical terms such words as "Crounotherapy" and "Crenology," which are really not needed, and the same figure with slightly different description is given on pages 73 and 245.

The Mental Symptoms of Brain Diseases—An Aid to the Surgical Treatment of Insanity, Due to Injury, Hæmorrhage, Tumors and Other Circumscribed Lesions of the Brain. By Bernard Hollander, M. D. With Preface by Dr. Jul. Morel. Price $2. (*New York: Rebman Company, 1910.*)

In this work the author has classified a large number of cases taken from the literature under lesions of the different lobes depending on the nature of the symptoms shown. Under lesions of the frontal lobes he groups cases where the higher intellectual operations or the centers of perception and special memories or the higher human sentiments seem to be most affected. Cases of melancholia are grouped under lesions of the parietal lobes; and others of violent and homicidal mania fall under lesions of the temporal lobes, and so on. Such a classification as all neurologists know cannot be exact, for symptoms are not always clear cut, but one group shades into another, and an exact diagnosis of the site of the lesion cannot be made. The book, if used with thought, may, however, be helpful as a guide to students in their earlier studies of brain lesions.

BOOKS RECEIVED.

Text-Book of Bacteriology. A Practical Treatise for Students and Practitioners of Medicine. By Philip Hanson Hiss, Jr., M. D., and Hans Zinsser, M. D. With one hundred and fifty-six illustrations in the text, some of which are colored. 1910. 8vo. 745 pages. D. Appleton and Company, New York and London.

seases of Infants and Children. By Edmund Cautley, M. D., Cantab., F. R. C. P. Lond. 1910. 8vo. 1042 pages. Paul B. Hoeber, New York.

e Sexual Disabilities of Man and Their Treatment. By Arthur Cooper. Second edition, revised and enlarged. 1910. 16mo. 204 pages. Paul B. Hoeber, New York.

inary Surgery. A Review. By Frank Kidd, M. D., B. C. (Cantab.), F. R. C. S. 1910. 8°. 429 pages. Longmans, Green and Company, London, New York, Bombay and Culcutta.

uses of Evolution and Heredity. By David Berry Hart, M. D., F. R. C. P. E. 12mo. 259 pages. Rebman Company, New York.

Principles and Practice of Medicine. By William Osler, M. D., F. R. S. Seventh edition. Translated by Philip B. Cousland, M. B., C. M., Edin. 1910. 8vo. Publication Committee, China Medical Missionary Association, Shanghai.

Anatomical and Surgical Study of Fractures of the Lower End of the Humerus. By Astley Paston Cooper Ashhurst, A. B., M. D. The Samuel D. Gross Prize Essay of the Philadelphia Academy of Surgery, 1910. 8vo. 163 pages. Lea & Febiger, Philadelphia and New York.

anual of Nursing. By Margaret Frances Donahoe. Illustrated. 1910. 12mo. 489 pages. D. Appleton and Company, New York and London.

rt of the Surgeon-General, United States Army, to the Secre-ary of War, 1910. Annual Reports, War Department. Fiscal ear ended June 30, 1910. 8vo. 223 pages. Government rinting Office, Washington.

Recherches d'Anatomie Chirurgicale sur les Artères de l'Abdomen; Le Trona Coelicque. Par Pierre Descomps. 1910. 4°. 205 pages. G. Steinheil, Paris.

Eléments d'Anatomie Pathologique. Par L. Bériel. Avec 232 figures dessinées par le l'auteur. 8vo. 563 pages. G. Steinheil, Paris.

Urgent Surgery. By Félix Lejars. Translated from the sixth French edition by William S. Dickie, F. R. C. S. With 20 full-page plates and 994 illustrations, of which 602 are drawn by Dr. E. Daleine and A. Leuba, and 217 are from original photographs. Vol. II. The Genito-Urinary Organs—The Rectum and Anus—the Strangulated Hernias—the Extremities. 1910. 4to. 580 pages. William Wood and Company, New York.

The Mental Symptoms of Brain Disease. An Aid to the Surgical Treatment of Insanity, due to Injury, Hæmorrhage, Tumors and other Circumscribed Lesions of the Brain. By Bernard Hollander, M. D. With preface by Dr. Jul. Morel. [1910.] 12mo. 237 pages. Rebman Company, New York.

The Modern Treatment of Alcoholism and Drug Narcotism. By C. A. McBride, M. D., L. R. C. P. & S. (Edin.) [1910]. 12mo. 376 pages. Rebman Company, New York.

Hints for the General Practitioner in Rhinology and Laryngology. By Dr. Johann Fein. Translated by J. Bowring Horgan, M. B., B. Ch. With forty figures in the text and two photographic plates. [1910.] 12mo. 223 pages. Rebman Company, New York.

Anæmia. By Geh. Obermedizinalrat Professor Dr. P. Ehrlich and Dr. A. Lazarus. Volume 1. Part 1. Normal and Pathological Histology of the Blood. Second edition (enlarged and to a great extent rewritten), by Dr. A. Lazarus and Dr. O. Naegeli. Translated from the German by H. W. Armit, M. R. C. S., L. R. C. P. (London). With 5 illustrations in the text and 5 colored plates. 1910. 8vo. 218 pages. Rebman Company, New York.

Diagnosis and Treatment of Diseases of Women. By Harry Sturgeon Crossen, M. D. Second edition, revised and enlarged. With seven hundred and forty-four engravings. 1910. 8vo. 1025 pages. C. V. Mosby Company, St. Louis.

Dispensing Made Easy. With Numerous Formulæ, and Practical Hints to Secure Simplicity, Rapidity and Economy. By Wm. G. Sutherland, M. B. Aberd. Fourth edition, revised by F. J. Warwick, B. A., M. B. Cantab., M. R. C. S., L. S. A. 1910. 16°. 102 pages. John Wright & Sons, Ltd., Bristol; Simpkin, Marshall, Hamilton, Kent and Co., Ltd., London.

The Diseases of China, Including Formosa and Korea. By W. Hamilton Jefferys, A. M., M. D., Univ. of Pennsylvania, and James L. Maxwell, M. D. London. With 5 colored plates, 11 nosogeographical plates, and 360 illustrations in the text. 1910. 8vo. 716 pages. P. Blakiston's Son & Co., Philadelphia.

Modern Treatment. The Management of Disease with Medicinal and Non-Medicinal Remedies. In Contributions by American and Foreign Authorities. Edited by Hobart Amory Hare, M. D. Assisted by H. R. M. Landis, M. D. In Two Volumes. Volume I. Illustrated. 1910. 8vo. 930 pages. Lea & Febiger, Philadelphia and New York.

The Racial Anatomy of the Philippine Islanders. Introducing New Methods of Anthropology and Showing their Application to the Filipinos with a Classification of Human Ears and a Scheme for the Heredity of Anatomical Characters in Man. By Robert Bennett Bean, B. S., M. D. With nineteen illustrations reproduced from original photographs. Seven figures. 1910. 8vo. 236 pages. J. B. Lippincott Company, Philadelphia and London.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by Hobart Amory Hare, M. D., assisted by Leighton F. Appleman, M. D. Volume IV. December, 1910. 8vo. 360 pages. Lea & Febiger, Philadelphia and New York.

Scientific Memoirs. New Series, No. 38. By Officers of the Medical and Sanitary Departments of the Government of India. *Preliminary Report on the Killing of Rats and Rat Fleas by Hydrocyanic Acid Gas.* By Captain W. D. H. Stevenson, M. B., I. M. S. 1910. Fol. 28 pages. Superintendent Government Printing, Calcutta, India.

An Introduction to Surgery. By Rutherford Morison, M. A., M. B., F. R. C. S. Edin and Eng. With 146 illustrations in the text, and 5 colored plates. 1910. 4to. John Wright & Sons, Ltd., Bristol; Simpkin, Marshall, Hamilton, Kent & Co., Ltd., London.

Practical Bacteriology, Blood Work and Animal Parasitology. Including Bacteriological Keys, Zoological Tables and Explanatory Clinical Notes. By E. R. Stitt, A. B., Ph. G., M. D. Second edition, revised and enlarged with 91 illustrations. 1910. 12°. 345 pages. P. Blakiston's Son & Co., Philadelphia.

International Clinics. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles. Edited by Henry W. Cattell, A. M., M. D. Volume IV. Twentieth Series, 1910. 8vo. 308 pages. J. B. Lippincott Company, Philadelphia.

Principles of Therapeutics. By A. Manquat. Translated by M. Simbad Gabriel, M. D. 1910. 8vo. 298 pages. D. Appleton and Company, New York and London.

Clinical Pathological in Practice. With a Short Account of Vaccine-Therapy. By Thomas J. Horder, B. Sc., M. D., F. R. C. P. 1910. 8vo. 216 pages. Oxford Medical Publications. Henry Frowde, London; Hodder & Stoughton, London.

Puerperal Infection. By Arnold W. W. Lea, M. D., B. S. (Lond.) B. Sc. (Manch.), F. R. C. S. (Eng.). 1910. 8vo. 384 pages. Oxford Medical Publications. Henry Frowde, London; Hodder & Stoughton, London.

Induced Cell-Reproduction and Cancer. The Isolation of the Chemical Causes of Normal and of Augmented, Asymmetrical Human Cell-Division. By Hugh Campbell Ross, M. R. C. S. (Eng.), L. R. C. P. (Lond.). Being the results of researches carried out by the author with the assistance of John Westray Cropper, M. B., M. Sc. (Liv.), M. R. C. S. (Eng.), L. R. C. P. (Lond.). With 129 illustrations. 1911. 8vo. 423 pages. P. Blakiston's Son & Co., Philadelphia.

Emanuel Swedenborg's Investigations in Natural Science and the Basis for His Statements Concerning the Functions of the Brain. By Martin Ramström. 1910. 4to. 59 pages. University of Upsala.

Studies in Invalid Occupation. A Manual for Nurses and Attendants. By Susan E. Tracy. 1910. 8vo. 175 pages. Whitcomb & Barrows, Boston.

Nurses Handbook of Drugs and Solutions. By Julia C. Stimson, R. N. 1910. 12°. 82 pages. Whitcomb & Barrows, Boston.

A Text-Book of General Bacteriology. By Edwin O. Jordan, Ph. D. Second edition, thoroughly revised. Fully illustrated. 1910. 8vo. 594 pages. W. B. Saunders Company, Philadelphia and London.

The Practice of Surgery. By James Gregory Mumford, M. D. With 682 illustrations. 1910. 8vo. 1015 pages. W. B. Saunders Company, Philadelphia and London.

Hydrotherapy. A Work on Hydrotherapy in General, its Application to Special Affections, the Technique or Processes Employed, and the Use of Waters Internally. By Guy Hinsdale, A. M., M. D. Illustrated. 1910. 8vo. 466 pages. W. B. Saunders Company, Philadelphia and London.

Treatise on Diseases of the Skin. By Henry W. Stelwagon, M. D., Ph. D. Sixth edition, thoroughly revised. With 289 illustrations in the text, and 34 full-page colored and half-tone plates. 1910. 8vo. 1195 pages. W. B. Saunders Company, Philadelphia and London.

Dawn of the Fourth Era in Surgery. And Other Short Articles Previously Published. By Robert T. Morris, A. M., M. D. 1910. 12°. 145 pages. W. B. Saunders Company, Philadelphia and London.

Transactions of the American Gynecological Society. Volume 35. For the year 1910. 8vo. 566 + LXII pages. Philadelphia.

Transactions of the Congress of American Physicians and Surgeons. Eighth Triennial Session held at Washington, D. C., May 3 and 4, 1910. 8vo. 456 pages. Published by the Congress, New Haven, Conn.

The Harvey Lectures. Delivered Under the Auspices of the Harvey Society of New York, 1909-1910. By Prof. Richard M. Pearce, Prof. Otto Cohnheim, Prof. T. G. Brodie, Prof. G. Carl Huber, Prof. Ludwig Hektoen, Prof. Eugene L. Opie, Prof. Adolf Meyer, Prof. A. Magnus-Levy. 1910. 8vo. 276 pages. J. B. Lippincott Company, Philadelphia and London.

The Johns Hopkins Hospital Bulletins are issued monthly. They are printed by the LORD BALTIMORE PRESS, Baltimore. Subscriptions, $2.00 a year (foreign postage, 50 cents), may be addressed to the publishers, THE JOHNS HOPKINS PRESS, BALTIMORE; single copies will be sent by mail for twenty-five cents each. Single copies may also be procured from the BALTIMORE NEWS CO., Baltimore.

BULLETIN

OF

HE JOHNS HOPKINS HOSPITAL

Entered as Second-Class Matter at the Baltimore, Maryland, Postoffice.

<XII.—No. 241.] BALTIMORE, APRIL, 1911. [Price, 25 Cents

CONTENTS.

PAGE

. Notes. (1) Intermittent Fever in Influenza Simulating
larial Fever. (2) Grave Malarial Fever with few Parasites
the Peripheral Circulation. Dangers of the Intravenous
ection of Quinine. (Illustrated.)
ʼy William Sydney Thayer, M. D. 101

ıparation of Antitoxin.
ʼy E. J. Banzhaf, Ph. D. 106

nical Value of the Determination of the Catalytic Activity
the Blood.
ʼy M. C. Winternitz, M. D. 109

a Pulmonale in Wisconsin.
ʼy Henry Hanson, M. D. 112

Platelets and Megalokaryocytes in Hodgkin's Disease.
ustrated.)
ʼy C. H. Bunting, M. D. 114

PAGE

Primary General Peritonitis with Isolation of the *Bacillus Lactis Aerogenes* in Pure Culture from the Peritoneal Exudate. (Illustrated.)
By John W. Churchman, M. D. 116

The Submucous Resection of the Nasal Septum, Technique and Results in the Writer's Practice. (Illustrated.)
By Sylvan Rosenheim, M. D. 121

The Growth of Embryonic Chick Tissues in Artificial Media, Agar and Bouillon.
By Margaret Reed Lewis, M. D., and Warren H. Lewis, M. D. 126

Proceedings of Societies.
The Johns Hopkins Medical Society 127
Employment of Radium as an Aid to Surgery in the Treatment of Cancer, Angioma and Keloid [Dr. Louis Wickham].

Notes on New Books 128

CLINICAL NOTES.*

NTERMITTENT FEVER IN INFLUENZA SIMULATING MALARIAL FEVER. RAVE MALARIAL FEVER WITH FEW PARASITES IN THE PERIPHERAL CIRCULATION. DANGERS OF THE INTRAVENOUS INJECTION OF QUININE.

By William Sydney Thayer, M. D.,
Associate Physician, The Johns Hopkins Hospital, Baltimore.

r one who has observed much malarial fever is familiar
e fact that well-marked paroxysms may occur with
ence of very few parasites in the peripheral circulation.
is is not uncommon in mild tertian infections. (b)
more, it is observed at the onset of mild and even of
less serious æstivo-autumnal fever, especially during
od of the paroxysm. The cause of this is evident
when we remember that the sporulation of the para-
ich immediately precedes and accompanies the par-
both tertian and æstivo-autumnal fever, occurs, espe-
capillaries of certain of the internal organs, particu-
he spleen and bone marrow. In most mild cases of
tumnal fever, it is rather difficult to find sporulating
in the peripheral circulation. (c) The same condition, *i. e.*, well-marked fever with few or no parasites demonstrable in the peripheral circulation, is seen in both tertian and æstivo-autumnal infections, but, especially in the latter, where quinine has been given in insufficient doses early in the attack.

In most patients, careful examination of blood reveals parasites within the twenty hours succeeding the paroxysm, and, even in the absence of parasites, the diagnosis is usually sufficiently clear through the history of the case and the physical appearances, in connection with the condition of the blood which shows usually (1) leucopenia, (2) pigment-bearing leucocytes, (3) a relative increase in the large mononuclear leucocytes.

Nevertheless, it is well known that there are occasional cases in which, without splenic puncture, a diagnosis can be reached only by the therapeutic test. These cases are not common and,

---

ks made before the Johns Hopkins Hospital Medical
Oct. 17, 1909.

in a community where a study of blood is a part of the routine examination, as it is here, where one usually waits for the demonstration of parasites before the administration of quinine, it is easy to lay too much stress on the negative results of such examinations and to forget that grave and even pernicious malaria may occur in an individual with so few parasites in the peripheral circulation as to deceive even the skilled observer on repeated examinations.

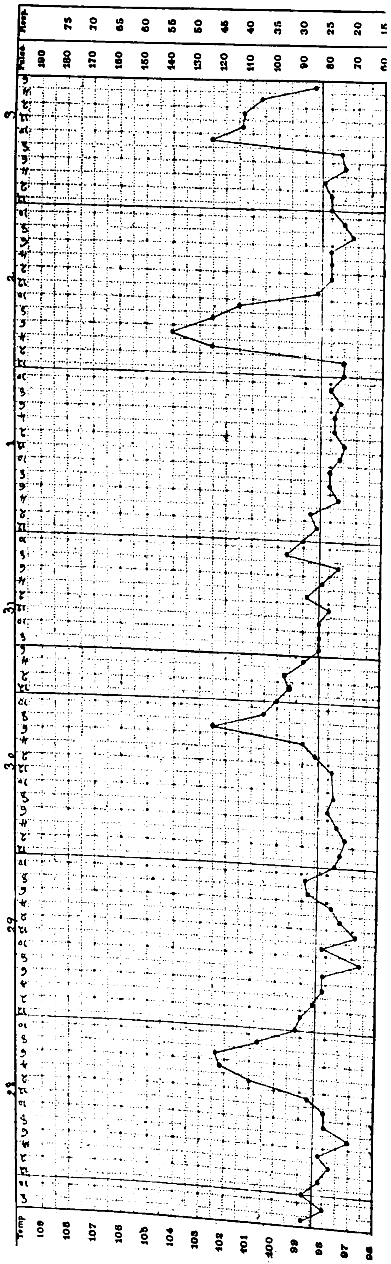


CHART I.—INFLUENZA.

On the other hand, however, 'tis very important to remember that certain other infections may give rise to paroxysms which intrinsically, and in the character of their periodicity, may closely simulate malaria.

The paroxysms of streptococcus, pneumococcus and gonococcus septicæmia are usually distinguishable by the irregularity, often the great frequency of the paroxysms, and the short duration of the individual access. The paroxysms recurring in tuberculosis may often suggest malaria, but are usually readily distinguishable. In the experience of the writer, influenza is the malady which gives rise to those forms of intermittent fever which most closely simulate malarial paroxysms. Of the four cases of which we shall speak this evening, two are examples of influenza simulating malaria, and two are instances of grave malarial fever with a remarkable paucity of parasites in the peripheral circulation.

CASE I.—*Influenza—Tertian Paroxysms Simulating Malaria.* The first chart, which has already been published in my "Lectures on the Malarial Fevers," * is that of a woman, E. D., aged 29, who was a patient on Ward "G" of the Johns Hopkins Hospital. The chart, as you will see, shows a febrile paroxysm beginning between 2 and 4 p. m., on the 28th of January and lasting 12 hours. This was succeeded on the 30th by a similar paroxysm beginning about two hours later and lasting about the same length of time. The patient came from a malarious district and we naturally suspected a tertian infection. On the first of February, however, there was no rise of temperature and on the 2d and 3rd, sharp elevations occurred, one between 12 and 2 in the morning and the other between 8 and 10 on the following morning. These latter paroxysms, of course, would be sufficient, on examination of the chart alone, to render the diagnosis of malaria improbable.

Now, this patient complained of coryza and cough with a greenish purulent expectoration, and showed the signs of a general bronchitis. Examination of the blood revealed no malarial organisms, and a leucocytosis of 17,000. Influenza bacilli were cultivated from the sputa and the patient recovered without relapse and without the administration of quinine.

CASE II.—*Influenza—Remittent and Intermittent Fever Simulating Malaria.* The second chart is that of a patient whom I saw in February, 1907, with Dr. Friedenwald. As you will see, there is a period of four days of irregular fever, followed by three quotidian paroxysms, each beginning between 8 and 10 in the morning and closely simulating paroxysms of a regularly intermittent malaria. One might well have fancied that the case represented one of infection with mutiple groups of parasites which, under rest in bed had gradually given way until the effects of two strong groups became clearly evident.

The patient, however, was a boy of about 17 who had been ill for about three or four days before the beginning of the chart, complaining of coryza and cough with purulent expectoration and the general symptoms of influenza which was prevalent at the time. From the onset, he had been treated with quinine, gr. iii (0.2 gm.) every four hours. Well-marked chills continued for nearly a week after the onset of treatment. The blood showed no malarial parasites.

I saw the patient first on the 14th of February, at which time he showed a general bronchitis. Quinine was omitted and aspirin, gr. v. (0.325 gm.) every four hours ordered. Cultures from the sputa showed *B. influenzæ*.

The point of special interest in this case would appear to be the sharpness of the paroxysms which were associated with definite

---

* Thayer, W. S.: Lectures on the Malarial Fevers, New York. D. Appleton & Co., 1897.

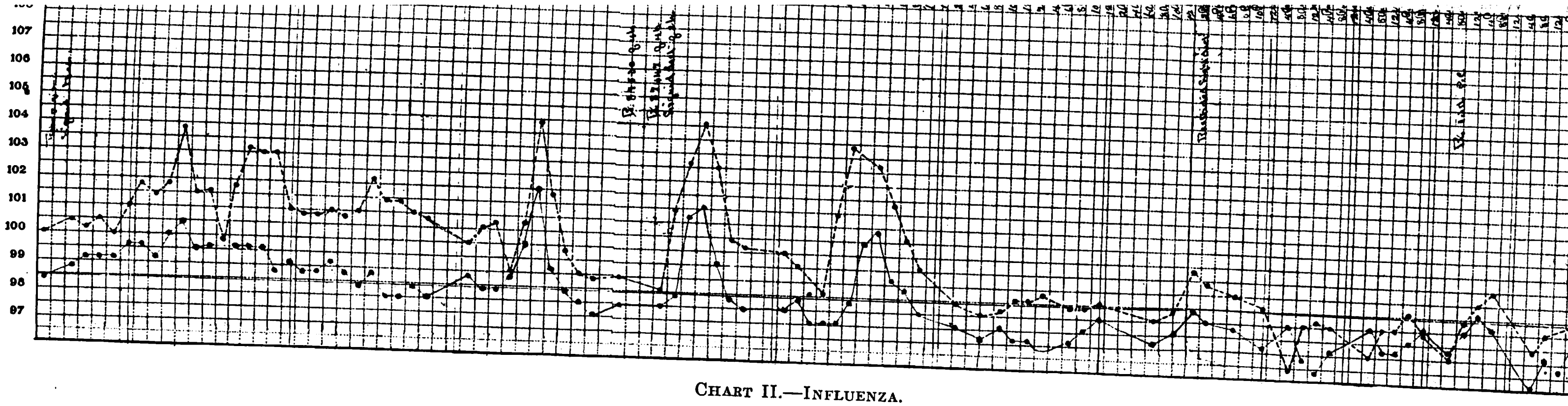


CHART II.—INFLUENZA.

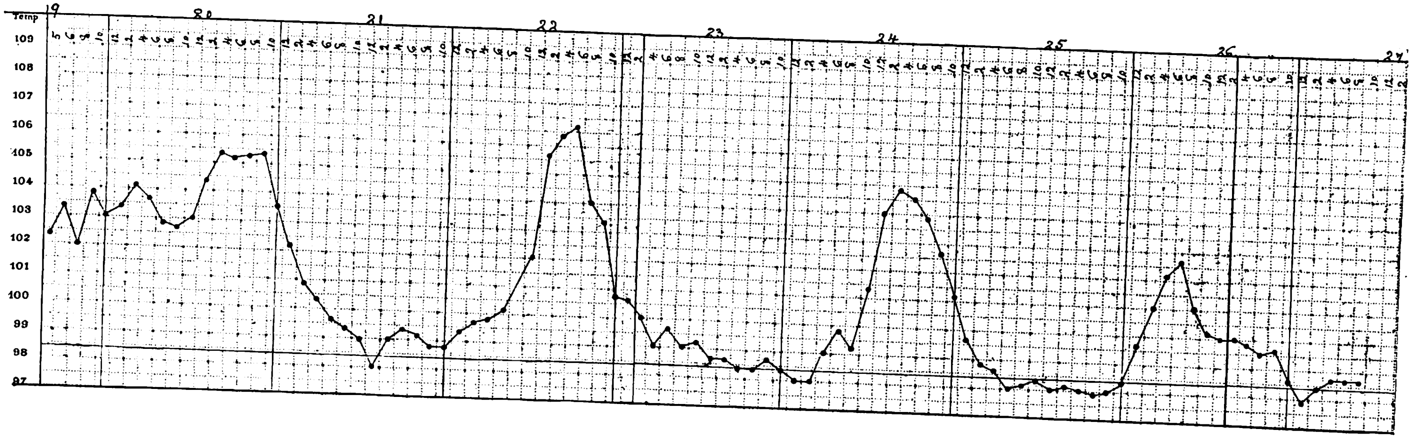


CHART III.—MALARIAL FEVER, ÆSTIVO-AUTUMNAL TERTIAN.

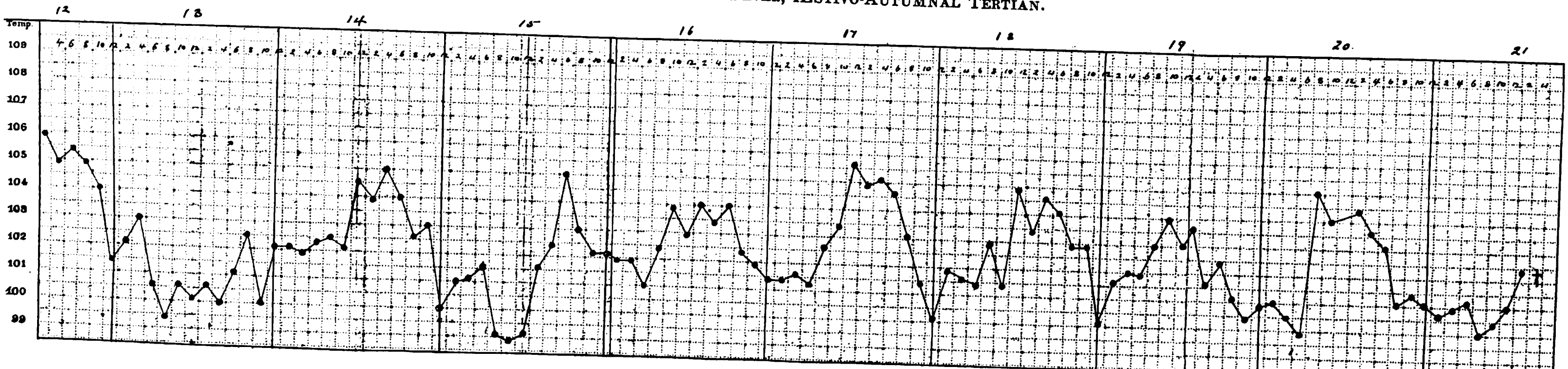


CHART IV.—MALARIA.—ÆSTIVO-AUTUMNAL TERTIAN.

chills, and the regularity of their onset in the morning hours, as is common in malaria.

Case III.—*Intermittent Fever of the Type of Aestival Tertian. No Parasites Demonstrable in the Peripheral Circulation. Immediate Disappearance of Fever under Quinine.* The third chart that I would show you presents a rather different appearance. As you will see, there is continued fever on the 19th and 20th of October, the temperature reaching a sub-normal point on the 21st. This is followed by sharp paroxysms on the 22d, 24th, and 26th, the paroxysms beginning in the early morning hours and lasting nearly 24 hours. The chart is typical of aestivo-autumnal tertian fever.

The patient was a medical student of 28. He had been in a malarious district and, two days before admission, had begun to complain of general malaise and on the day preceding admission, of fever. On the day of admission, the 19th of October, he had taken three doses of quinine, how much is not known. On entrance, the temperature was 102.4° F. at 5 P. M., the pulse 80, respiration 24. There was nothing striking on physical examination of the patient beyond a palpable spleen which extended 3 cm. below the costal margin. The examination of the blood was negative; no parasites and no pigment were seen and the leucocytes were 6400 per cmm.

Oct. 20. The temperature remained elevated. In the afternoon, there was a chill and the temperature rose to 105.8° F.; leucocytes, 4640.

Oct. 21. The temperature fell gradually to 98° F. at noon.

Oct. 22. There was a sharp rise in temperature with a chill at about 6 p. m., the temperature reaching 106.7° F. This was followed by a rapid fall, and, on Oct. 23, the temperature was normal. On Oct. 24, the temperature rose slightly in the early morning hours, a sharp paroxysm beginning at 8, with a chill at noon, during which the temperature rose to 105° F. During all these days, the blood was carefully and repeatedly examined in both fresh and stained specimens. Neither parasites nor pigment was to be found and the leucocytes diminished to between 3,000 and 4000 per cmm.

At 8 p. m., on the 24th, quinine sulphate gr. x (0.65 gm.) every four hours was ordered.

On the 25th, the temperature was normal.

Early in the morning of the 26th, there was a slight paroxysm, much less intense than the preceding but lasting a full 24 hours. After this, the temperature remained permanently normal. Quinine was continued for a long period of time and there was no relapse. Repeated examinations of blood showed no parasites whatever and no pigment.

Now, the history of this case, the time of the year at which it occurred, the character of the febrile curve, the palpable spleen, the leucopenia and the apparently specific action of quinine, leave no serious doubt in one's mind that this was a case of malaria, probably æstivo-autumnal.

This is the first case in the history of the hospital in which we have been obliged to resort to the therapeutic test for the proof of the existence of a malarial infection.

Splenic puncture would probably have assisted us materially in the diagnosis. This was not performed because of the danger, minimal though it be. I have, myself, aspirated many spleens without the slightest trouble, and, in any case of emergency, I should have no hesitation in so doing again. Some years ago, however, I witnessed a fatal result of splenic puncture. The patient was a foreigner, unable to understand English. He failed to comprehend the procedure and jumped on the introduction of the hypodermic needle. This resulted in a small tear of the splenic capsule with fatal hæmorrhage into the peritoneal cavity. Although I feel convinced that with proper precaution, the danger is almost *nil*—and this has been the experience among more careful Italian observers, one of whom Prof. Bastianelli, is with us this evening, yet I cannot feel that splenic puncture is justified excepting in cases of real necessity.

It is interesting that Ruge * makes the surprising statement that "the mortality from splenic puncture, which has been observed up to the present time, amounts to 1½ per cent."

It is highly probable that the early administration of quinine was in this case responsible firstly, for the development of the regular paroxysms; secondly, for the disappearance of parasites in the peripheral circulation.

Case IV.—*Grave Æstivo-Autumnal Tertian Fever. Remarkable Paucity of Parasites in the Peripheral Circulation. Convulsions and Death Following the Subcutaneous Injection of Quinine.*—In addition to these three cases, I would speak of another patient whose history is remarkable from various standpoints. The chart, as you will see, shows that which on first appearance appears to be a wholly irregular remittent fever. There are, however, certain very sharp remissions while many of the smaller oscillations are dependent upon the administration of baths. A careful study of the chart shows that every other day (on the 14th, 16th, 18th and 20th of October) there was a sharp rise of temperature somewhere between 6 and 10 a. m. This is followed by a remission during the afternoon and night and a second rise on the following day with a fall occurring in the afternoon or evening. In other words, the chart suggests the pseudo-crisis and subsequent elevation first described in æstivo-autumnal tertian fever by the Italian observers. Such a chart might well suggest an æstivo-autumnal tertian.

This patient was a sailor on a bay boat, a Spaniard, aged [illegible] who was said to have had malaria 13 years before. One week before entry, he began to complain of abdominal pain and diarrhœa. Four days before entry, there was headache, anorexia and nausea.

On Oct. 12, 1909, he was admitted at about 2 p. m. with a temperature of 105.8° F.; pulse, 104; respiration, 24. His appearance was typhoidal; the spleen was large, soft and palpable; there were several suggestive rose spots. The blood showed no parasites. The count was:

R. B. C.	5,280,000
W. B. C.	5,600
Hæmoglobin	90%

The coagulation time was three minutes, thirty seconds.

Urine: Normal color; sp. gr., 1.015, slight trace of albumen. In other respects, not remarkable.

On Oct. 13, 1909, I saw the patient on a morning visit. The temperature had fallen from nearly 106° to 99.4° F. He had a characteristically typhoidal appearance. The temperature was regarded as suggestive of malaria, but fresh and stained specimens of blood were negative. The Widal test was negative; the Diazo reaction was positive.

The chart illustrates the course of events. Daily blood examinations revealed no parasites. There was a leucopenia of 3,800 to 5,200. Five days later, a slight jaundiced tint was noted. The blood pressure, which at the outset ranged from 97-114, was on the 19th, 84 mm. Hg.

I next saw the patient on Oct. 20, 1909, just a week after my first visit. At that time, the temperature was about 105° F. There was a great change in the general picture. The facies was very dull and typhoidal. There was a very distinct anæmia and a slight greenish-yellow jaundice. The respirations were from 28 to [illegible] The liver was readily palpable. The appearance was wholly characteristic of malaria. A fresh specimen of blood was taken immediately and a considerable number of æstivo-autumnal parasites were found. These were for the most part bodies containing

---

* Einführung in das Studium der Malariakrankheiten, 2 aufl. S. Jena, 1906, Fischer, 221.

[illegible]menting bodies). The patient was viously an ill man. It was suggested that he be given vigorous eatment, i. e., quinine bi-muriate gr. xv (1 gm.) in 10 cc. normal lt solution intravenously, to be repeated, if necessary, in four urs, and afterwards, quinine sulphate gr. v (0.325 gm.) every ır hours by mouth.

The solution was not made by the apothecary until several urs after the visit and then, by a misunderstanding, of double ength, so that at 12 o'clock on the 20th, the patient was ven quinine bi-muriate gr. xv (1 gm.) in 5 cc. of normal salt ution. Immediately after its introduction, there was a momenry convulsion accompanied by a slight twitching of the eyelids d lower lip, followed at once by general spasmodic contractions the trunk and extremities. The eyes were rolled up and the ad was somewhat retracted and turned to the right. Recovery s almost instantaneous and the patient soon seemed better than was before. Thereafter, he was given quinine sulphate gr. x .6 gm.) by the mouth, every four hours.

Oct. 21. At 1 a. m. the patient was given a second intravenous jection of quinine bi-muriate gr. xv (1 gm.) without unpleasant sults. In the morning, the temperature had fallen to 100° F., pulse was from 90 to 100, and the patient seemed better. At . m., however, the temperature was rising again and a third ravenous injection of quinine bi-muriate gr. xv (1. gm.) was ministered. Immediately upon its introduction the patient be1 to show convulsive twitching of the eyelids and lips; this was lowed by a general convulsion. There was marked cyonosis; pulse disappeared; the patient failed to respond to stimulants artificial respiration.

Re-examination of the stained specimen of blood made on the h, showed, after long search, two characteristic æstivo-autumnal ıgs, which had been overlooked on a previous examination.

The *necropsy* made by Dr. Thomas twenty-eight hours after ath, showed a severe but not intense malarial infection. The in showed nothing remarkable—little pigment in the vess. The spleen was large and soft, and microscopically showed ch pigment—for the most part in leucocytes. Smears showed nerous segmenting parasites. The liver weighed 2700 grammes l was of a slate color; the cut surface was opaque. There was rked parenchymatous degeneration and the capillaries coned much pigment. The bone marrow showed numerous paras in smears.

oth kidneys showed marked cystic degeneration,—the right asuring 16 x 10 x 7 cm. The entire surface was studded with s, the diameter of which ranged from a millimetre or less to m. The contents varied in color—clear—brownish—opales, and in some instances apparently contained changed blood. pelves were greatly dilated. On section, the tissue which reed showed few changes in gross, but microscopically, there a definite increase in fibrous tissue and some congestion of the recta; in the portion of the kidney showing cystic change, e was considerable cloudy swelling with marked increase in us tissue. The cysts were lined with cuboidal epithelium.

is case is exceedingly interesting as an example of grave inon with few parasites in the peripheral circulation througha week of study and observation.

e occasional absence of parasites in the peripheral circulaespecially in grave cerebral cases, has been emphasized by observers, notably by Bastianelli. I have never seen, howa case of such severity with so long an absence of parasites.* e correct diagnosis was suggested here by the character of ver, the general appearance of the patient and the leucopenia, and, even in the absence of parasites, I should have ordered quinine when I saw him on the 20th.

The most interesting point in connection with the case is the question as to the cause of death. From the result of the necropsy and from my observation of the patient, I should feel sure that it was *not* due directly to his malarial infection; on the other hand, I should feel reasonably sure from the history of the case that it *was* directly due to the intravenous injection of the quinine.

The literature upon quinine poisoning is very large and there are many instances of apparent death from large doses. The amount administered to this patient was, however, by no means remarkable, although considerably larger than that which is customary in this hospital. Several points are, however, worthy of note.

The first of these is the concentration of the dose. The speaker has always been in the habit of giving quinine intravenously according to the method of Bacelli in a solution consisting of

	gm.
Quin. dihychlor.	1.
Aquæ	10.
Sod. chloridi	0.065,

one-half of this being given in one median basilic vein and one-half in the other. In this instance, a dose of double the concentration was given at once. The patient had received 6 grammes of quinine in 24 hours, 7 in 28 hours, 3 grammes having been administered intravenously. The direct sequence of the symptoms in connection with the first and third injections of quinine was such as to leave little doubt as to the relation of the dose to the manifestations. While the dose was certainly strikingly concentrated, yet one must probably assume also that the individual was hyper-susceptible to the drug.

The specimen of quinine was from the same sample which had been used in other cases, and, so far as could be made out, showed no impurity.

A point of interest in connection with the case which may have an important bearing upon the fatal outcome, is the fact that the patient had cystic disease of his kidneys. Prof. Abel was much impressed by this fact, feeling that it suggested strongly that an unusual retention of the drug might have contributed toward rendering the patient more susceptible to the last dose. It must be said that the excretory powers of the kidneys seemed to be good and that anatomically, there was still considerable cortical substance. However this may be, the observation seems to be worth recording. I have for years been in the habit of advising the intravenous injection of quinine in urgent cases. Such an experience as this would certainly suggest caution in administering a solution of a concentration greater than 10 per cent. More than this, it points, it seems to me, to the advisability of conservatism in the administration of quinine intravenously in other than urgent cases of pernicious malaria.

In conclusion, let me emphasize one point, an old lesson, after all, which these two latter cases illustrate, i. e., that while careful and repeated examinations of blood in a vast majority of cases answer the question as to the presence or absence of malarial infection, really grave malaria may exist for considerable periods of time without demonstrable parasites or pigment in the peripheral circulation. In case of doubt, do not delay too long before applying the therapeutic test.

---

lthough I did not examine these daily specimens, seeing the t but twice, yet I am sure of the care with which the case llowed by a most capable ward physician.

THE JOHNS HOPKINS HOSPITAL REPORTS.

Vol. XIII, Studies in Urological Surgery—605 pages, with 6 plates, 201 figures and 1 colored chart.

Vol. XIX, Studies in Hypertrophy and Cancer of the Prostate—632 pages, with 97 figures. Price per volume in paper, net $5, in cloth, $5.50.

Orders and remittances should be made to

THE JOHNS HOPKINS PRESS, BALTIMORE, MD.

THE PREPARATION OF ANTITOXIN.*

By E. J. Banzhaf, Ph. D.,

(*Research Laboratory, New York City Board of Health.*)

I accepted the invitation of your secretary, Dr. Moss, to speak to this well-known medical society, of the Johns Hopkins Hospital, upon the subject of antitoxin, with a mixed feeling of pleasure and trepidation. With pleasure at the honor bestowed upon me, through your secretary, and with trepidation that I might not fulfill your expectations. Inasmuch as the protective and curative value of the antitoxins is well established, the chemistry of these antibodies is possibly not so attractive as researches on the more baffling diseases. However, any knowledge we can gain from the chemistry of the antibodies will help to solve other difficulties in general biology, physiology and pathology.

It is now about fifteen years since diphtheria antitoxin was introduced for the treatment of diphtheria. Hopes were entertained that the antitoxin would be isolated and purified. Up to the present time these hopes have been only partly fulfilled.

As early as 1893, Brieger and Ehrlich attempted to isolate the antitoxin from the milk of immune animals. Smirnow, in 1895, was probably the first to work with antitoxic horse serum. He showed that the active substance was precipitated with the globulins on saturating the serum with magnesium sulphate.

Brieger and Boer, in 1896, precipitated the globulins by adding neutral salts of the heavy metals and found the antitoxin in that protein. Aronson, in 1897, stated that the globulin precipitated by dialysis contained antitoxin.

Dieudonné showed that the globulins precipitated by carbon dioxide did not contain antitoxin.

The protein precipitate, obtained by both these workers, corresponded to the globulins of the serum as originally defined. This globulin is now known as euglobulin. Brodi, in 1897, separated the globulins into four fractions, by the progressive addition of ammonium sulphate to one half saturation. All four fractions contained, however, relatively equal amounts of antitoxin. Belfanti and Carbona, Freund and Sternburg, Marcus, Seng, Hiss, Atkinson and others confirmed the results of Brodi and Dieudonné.

Atkinson, in 1900, working in the Research Laboratory, saturated with sodium chloride a solution of globulins containing the antitoxin. By employing heat, he differentiated the globulins into several fractions containing antitoxin. The antitoxin corresponded to the quantities of globulin in the precipitates.

Pick, in 1901, attempted to differentiate the active portion of the serum by fractional precipitation with ammonium sulphate.

Pröscher attempted to isolate and establish the non-protein nature of antitoxin by digesting the serum with trypsin. He stated that in this way he obtained a solution containing antitoxin which was free from protein.

Mellanby and I, working independently in 1908, could not confirm Pröcher's work. The ratio of digestion of the protein was approximately the rate at which the antitoxin was destroyed.

That the antitoxins belong to that class of substances known as proteins, practically all investigators now agree.

It might be well, at this point, to call your attention to the fact that, in the early days, the antitoxic serum contained less than 100 units per cubic centimeter. This low grade of serum was principally due to the inability to produce a strong diphtheria toxin. Park and Williams, in 1896, isolated a diphtheria culture from a child with a mild case of diphtheria. This culture proved to be a strong toxin producer and is now used and known throughout the world as "Culture No. 8." With the toxin from this culture a more potent antitoxin was gradually obtained. Thus smaller injections of serum were required to give the same number of units. This was desirable, for it was early recognized, by Pirquet and Schick, that injections of antitoxic sera were sometimes followed, after an incubation period of eight to thirteen days, by urticarial eruptions, joint pains, fever, swelling of the lymph nodes, edema and albuminuria. These disturbances have no direct bearing on the antitoxic properties of the serum, for they showed that normal horse serum produces the same effects. This reaction Pirquet and Schick have termed "Serum Sickness."

Although almost all the investigators mentioned, and others, established the fact that the antitoxins were associated with the globulins, there was practically no record of actual administration of these globulins. Park, in 1900, first studied the possibility of eliminating serum rashes and other disturbances, by testing a considerable number of cases with an antitoxic globulin prepared by Atkinson. The results were practically identical with an equal number of cases treated with the whole serum from the same horse.

In 1905, Gibson, working in the Research Laboratory, perfected a practical method of recovering the pseudoglobulin containing the antitoxin. He placed the precipitated globulins obtained by half saturating with ammonium sulphate, in saturated sodium chloride solution. In this way the globulin insoluble in saturated sodium chloride solution, *i. e.*, euglobulin, present in Atkinson's preparation, was eliminated. The pseudoglobulin, which is insoluble in the saturated sodium chloride, was precipitated with acetic acid. This precipitate was then dialyzed. The finished concentrated product was about two and a half times the original potency.

With this product, Dr. Park again took up the study of rashes. The results of this work were favorable. Less early urbances, were noted. This 'eparation was so satisfactory, that the New York Board of ealth laboratory in 1906 sent out only this product. Other ɔoratories then followed suit.

---

* Read before the Johns Hopkins Medical Society, December 19, 1910.

At Dr. Park's suggestion, Gibson and I fractioned the anti- :ic serum with progressive amounts of ammonium sulphate to one-half saturation. Our experiments resulted some- at differently from those reported by Brodi, Atkinson and :k. We found that the pseudoglobulin of the higher frac- ıs contained uniformly much more antitoxin, per gram tein, than that precipitated by lower concentrations of nonium sulphate.

ꞵoth from a theoretical and practical view, the results were satisfactory. This fractioning of the antitoxic sera was pted in preference to Gibson's original method.

fter the partially purified antitoxin product was well es- ished, the question occasionally arose regarding its pro- ve and curative value in comparison with that of the whole m from which it was derived. According to certain ıch investigators and others, the antitoxic serum most e therapeutically is not always the one which contains greatest number of antitoxic units. They maintain that erum contains, besides antitoxin, other important pro- 'e and curative substances, which are not measured by the nt method of standardization. For instance, they state ı given quantity of a 200-unit serum is occasionally more , both preventively and curatively, than the same quan- f a 500-unit serum. Roux, Marfan, Martin, Momont, ilhier, and lately Kraus and Schwoner, support the h views, while on the other hand, some of the German, sh and American investigators support Ehrlich's method ıdardization.

conclusions of the work of Steinhardt and myself, in we used several strains of a 24-hour agar culture of live eria bacilli, with antitoxic serum of widely varying :hs, were that, with diphtheria in the guinea-pig, the əutic value of the serum depended upon the number of ic units present. No other substance, besides the anti- ɔlayed an important rôle. The conclusions of our work concentrated globulin containing the antitoxin, and the erum from which it was derived, were the same as just Since our work, in 1908, Kraus and Schwoner have əd four papers on this subject. The conclusions of all are diametrically opposed to our findings. Berghaus, in Ehrlich's laboratory, corroborated our findings, ed that he found great discrepancies in Kraus' stand- ɔn of the antitoxic value of the serum.

:ht state that we obtained three different samples of ə serum that Kraus and Schwoner used in their work. ere labelled to contain 200, 350 and 600 units, re- y.

standardizations, I found the first to contain 185 Deterioration in transit might account for this differ- he sample said to contain 350 units actually con- 55 units. The 600-unit sample contained only 360 units. In regard to the accuracy of their standardization on the two latter samples, no comment is necessary.

We will now discuss briefly the work by Gibson and myself, on the quantitative changes in the proteins in serum of horses in the course of immunization.

Seng, Joachim, Atkinson and Ledingham observed that when an animal is immunized against bacterial toxins, there result certain characteristic quantitative changes in the proteins of the blood plasma. The content of the globulins is strikingly increased even up to double the normal amount; at the same time, there is a diminution in the albumin.

Atkinson showed that this globulin increase is in some degree proportional to the antitoxic potency of the serum.

Ledingham, in a paper published while our work was under way, gave results of the determination of the total protein, the globulins and the albumin in the course of immunization against diphtheria toxin. The serum was obtained at short intervals from two horses.

In one horse, which failed to yield a high grade of antitoxin, the globulins of the serum were not essentially increased over the normal. The other horse gave ultimately a 650-unit serum; the globulins here had progressively increased along with the antitoxic potency. From Ledingham's results from the two horses, a relation between the development of the antitoxic properties and the increase in the globulins is indicated. Ledingham and Joachim state that the increase of the globulins is in the euglobulin fraction.

It may be desirable to discuss the fractioning of the globulins. The globulins are commonly stated to consist of at least two different proteins, the euglobulin, and a more soluble protein, the pseudoglobulin. The euglobulin is insoluble in pure water, and accordingly precipitated on dilution or dialysis; it is also thrown down by slight acidification. The pseudoglobulin belongs by definition to the group of true albumins; *i. e.*, it is soluble in pure water. In practice, investigators have commonly used the fractional precipitation by salting out with ammonium sulphate. A half volume of saturated ammonium sulphate solution is added to the serum; *i. e.*, one-third saturation. The precipitate is the euglobulin. The separation is not sharp at all. The filtrate contains the albumin and pseudoglobulin; the latter can be thrown down by the further addition of saturated ammonium sulphate solution to half saturation. In current writings the identity of this "fractioned" euglobulin has been confused with the slight precipitate obtained on dialysis, dilution, or slight acidification, in spite of the early work of Freund and Joachim. By employing the ammonium sulphate fractioning, Ledingham, like Joachim, found the increase in the globulins affected the euglobulin more than the pseudoglobulin fraction, *i. e.*, the great increase in the globulins took place in the non-antitoxic protein. Ledingham's interpretation of his results, as regards this point, seems inconclusive, for he does not grasp the significance of the limitations in the salt fractioning of the proteins. His observations, associating the increase in the globulins with the questionable euglobulin fraction, were made by direct precipitation of the serum with half its volume of saturated ammonium sulphate solution; *i. e.*, one-third saturation. When re-precipitated for purification, the protein was usually re-dissolved to the original volume and the same amount of ammonium sulphate solution added as before. Inasmuch as the globulins may have been doubled as the result of immunization, would not a great part of this increase be found naturally in the euglobulin fraction, since solubility of the protein must be considered? The precipitate obtained at one-third saturation is not free from antitoxin. It may contain the greater part of it when the undiluted serum is precipitated by the addition of a half volume of saturated ammonium sulphate solution. To illustrate this, Gibson and I precipitated ten cubic centimeters of plasma by the direct addition of five cubic centimeters of saturated ammonium sulphate solution; again, ten cubic centimeters of the plasma were diluted to 33⅓ cubic centimeters with water and precipitated by the addition of 16⅔ cubic centimeters of the saturated ammonium sulphate solution, and finally, a third ten cubic centimeters of the plasma were diluted to 66⅔ cubic centimeters with water and precipitated with 33⅓ cubic centimeters of the saturated ammonium sulphate solution. We then had ultimate dilutions of 15, 50 and 100 cubic centimeters each, at one-third saturation. The precipitates were allowed to stand for a few hours, with occasional shaking, to permit mechanically precipitated protein to return into solution. The precipitates, at the three dilutions, were then determined. We found the fraction to include 5.39, 1.78 and 0.98 grams of protein per 100 cubic centimeters at the three respective dilutions.

Because of this unsatisfactory characterization of the "eu-" and "pseudo-" globulin by the ammonium sulphate fractioning, it seemed of interest to differentiate in some modified way the relative globulin changes. We have accordingly determined as euglobulin that part of the globulins precipitated on saturating with sodium chloride.

Freund and Joachim state that saturation with sodium chloride precipitates all the euglobulin, but that this includes only a part of the product obtained at one-third saturation ammonium sulphate. We may consider that we have as sharp a differentiation as possible between the two globulins. The sodium chloride separation, probably, more truly represents the common conception of the euglobulin and pseudoglobulin, though the ammonium sulphate fractioning, heretofore, has usually been employed. With your permission, then, we shall term the globulin soluble in saturated sodium chloride solution, pseudoglobulin; and the globulin insoluble in saturated sodium chloride solution, euglobulin.

The observations of Atkinson and Ledingham were the only determinations of a quantitative relation of the globulins and the antitoxic potency throughout the course of immunization.

The subject is of extreme importance when the significance of the problem as to the chemical nature of the protective substances is considered, because of the constant relation of these substances with the pseudoglobulin, *i. e.*, the globulin soluble in saturated sodium chloride solution. In our work we followed quantitatively the protein changes in the plasma of eleven horses. The characteristic globulin increase duri immunization was observed in all the horses. The increa was found in the pseudoglobulin.

We allowed about six weeks to elapse after the immuniza was started, before taking a sample bleeding for analys From this time on samples were taken every week during th treatment. This first estimation gave us in all the horses a increase in the pseudoglobulin varying from 45 to 120 pe cent, and a loss of albumin from 25 to 85 per cent. Thus can be seen that great protein changes had taken place afte only six weeks immunization. That we missed the time o early changes we realized after it was too late.

The total proteins showed an increase of from 20 to 45 pe cent. This increase was at its highest after about two mont of treatment and was true in all the horses regardless of content. After two and a half to three months treatment th total proteins decreased and fluctuated somewhat througho their entire immunization.

The proteins, however, never dropped to the normal amou even though weekly full bleedings were taken; in some ca extending over a period of many months. This, therefo shows us that the influence of repeated bleedings does n essentially influence the protein changes induced by immunization. These remarkable regenerative processes are worth of note.

The highest antitoxic value obtained from these horses wa 850 units; at this time the albumin was 75 per cent lower tha this horse's normal amount, and the pseudoglobulin 90 pe cent higher. An exceptionally refractory horse, with its highest value 125 units, showed a decrease of 55 per cent albumi and an increase of 85 per cent of pseudoglobulin. Thus i can be seen that the decrease of albumin and the increase o pseudoglobulin take place in an immunized horse regardle of the antitoxic content. We wish to state, however, that th maximum antitoxic potency does not necessarily mean th other immune substances are present in greatest amounts o that they are developed in corresponding degree with the antitoxin. Immunization aimed to be of specific character ma lead to the production of other antibodies. Collins and othe have shown that group and specific bacterial agglutinins ca be developed by immunizations against yeasts, enzyme preparations and nucleins.

These experiments afford actual proof of the development o many widely different anti-substances during immunizati A similar stimulation, leading to the formation of numero antibodies besides the precipitins and specific antitoxins, probably occurs on immunization with bacterial toxins. Such substances may represent the increase in the pseudoglobulin wi which they are associated.

In the course of immunization, then, there is a marked increase (even over 100 per cent) in the pseudoglobulin conte of the blood plasma. This increase tends to precede the development of maximum antitoxic potency and is quantitativel independent of the latter. With a diminution of the poten the pseudoglobulin increase is reduced, with a tendency f this change to precede the antitoxin variation.

changes brought out the fact that the proteins eliminated in the process of purification were much less than we had expected. For, as is well known, in the average normal horse serum the proteins are distributed as follows: albumin 40 per cent; pseudoglobulin 42 per cent; euglobulin 18 per cent. Thus it would appear that about 58 per cent of the protein was eliminated in the purifying proc-ss. We now know, however, that in the average immunized horse the proteins of the serum are distributed as follows: lbumin 12 per cent; pseudoglobulin, containing the antitoxin, 78 per cent; euglobulin 10 per cent.

Thus only 15 to 25 per cent of the protein could be eliminated, depending on the fluctuation of albumin and euglobulin ontent of immunized horses.

Early in the spring of 1908, an observation of Stark's came o my notice.

Stark showed that when egg albumen was heated for one our at 56° C. a portion of it was converted into a body, which ppeared to be a globulin because of its precipitation and solution reactions. This fact aroused my curiosity as to what esult would be obtained if antitoxic serum or the antitoxic seudoglobulin solution was heated. With this in view, I arried out a large series of heating experiments with results that were rather gratifying as a means of further purifying he antitoxin. This gave at least 50 per cent purer antitoxin han had ever before been obtained. In order to make this clear, we will take the serum of an immunized horse. The roteins of this animal's serum, we will assume, are distributed as follows: albumin 12 per cent; pseudoglobulin, containing he antitoxin, 78 per cent; euglobulin 10 per cent. If we heat his serum from twelve to fifteen hours at a temperature of 7° C. we will have a rearrangement of the precipitation haracterization of the proteins. If we now estimate the bumin, we will find, instead of 12 per cent, only about 9 per nt; the pseudoglobulin, containing the antitoxin, instead of 78 per cent, only about 50 per cent; and the euglobulin, instead of 10 per cent, will be increased to about 41 per cent. All of the antitoxin, with the exception of about 7 per cent which is lost by the heat employed, will be found in the remaining pseudoglobulin.

From a scientific standpoint, this is extremely interesting, in that it opens a new field for further investigation, which may throw more light on the chemical characteristics and the nature of antitoxin.

Formerly, all the evidence was in favor of the pseudoglobulin nature of the antitoxins. The antitoxins had every known character of this protein. Mellanby, in 1908, stated that antitoxin is actually a part of the pseudoglobulin. Now, however, we know that we can heat the pseudoglobulin, containing the antitoxin, and actually change the precipitation limits of about one-third of it, *i. e.,* from the pseudoglobulin to the euglobulin condition, without loss of antitoxin. From this we can conclude that the pseudoglobulin in an immunized horse is not necessarily antitoxin. The chemical combination of pseudoglobulin and antitoxin, if such is the case, is not a fast and stable one. If a union does exist it must be merely an unstable combination that can be disassociated by heat. As an analogy to this, Calmette's work on cobra venom and its antitoxin might be mentioned. Calmette, you will remember, showed that when neutral mixtures of venom and antitoxin were heated, the antitoxin lost its identity and the venom regained its toxicity. He stated that the mixture of venom and antitoxin form an unstable combination and that each of the two substances preserves its individuality in the mixture.

From the knowledge we now have in regard to antitoxin, it is justifiable to conclude that there is a union between the antitoxin and pseudoglobulin, either a mere adsorption or an unstable chemical combination, and that the antitoxin can be disassociated from the pseudoglobulin without losing its identity.

THE CLINICAL VALUE OF THE DETERMINATION OF THE CATALYTIC ACTIVITY OF THE BLOOD.

By M. C. Winternitz, M. D.,
Associate in Pathology in the Johns Hopkins University.

(From the Pathological and Medical Clinical Laboratories of the Johns Hopkins Hospital.)

Catalase is an enzyme of universal occurrence characterized its power of decomposing hydrogen peroxide with the eration of water and molecular oxygen. Further than this y little is known concerning its function. Its intimate urrence with peroxidase, however, has led to the assumption t these two ferments are associated in the oxidative phe-mena of the body.

The following report is based upon a series of experimental clinical investigations in which C. R. Meloy, G. R. Henry, McPhedran, J. P. Pratt, and W. B. Rogers were associated the author.

Experimental Work.

The study of the catalytic activity of both normal and diseased human tissues and of the blood in experimentally produced diseases in animals is confined to a few isolated observations. For this reason we have first interested ourselves in this field and the results of these investigations seem so essential for the proper interpretation of the clinical application of the test that they will be briefly summarized.

The determination of the catalytic activity of human tissues led to the conclusion that all of the tissues of the body were reduced in their power to split hydrogen peroxide in chronic nephritis, and that this reduction varied directly with the severity of the condition. The lowest activity was obtained in uræmia. In no other disease, including eclampsia, was this universal decrease in the activity of the enzyme found (1).

After it had been determined that the catalytic activity of a single rabbit's blood is constant from day to day over long periods of time the influence of the kidney and its function upon the catalase of the blood was studied with the following results: after ligation of the ureters, bilateral nephrectomy or uræmia, resulting from uranium nitrate nephritis there is a fall in the catalytic activity of the blood which becomes more and more evident as death is approached. The tissues of such animals at autopsy show a like reduction (2).

The effect of salts on the catalytic activity of the blood of living rabbits was then investigated for the following reasons, (1) because it is well known that the addition of various salts to a catalase extract in vitro influences the action of the enzyme, and (2) because the decreased activity of the catalase of the blood in nephritis might in some way be related to the salt retention in this disease. The results seem conclusive. Acids, alkalies and salts all reduced the activity when injected intravenously. In these experiments it is important to make observations during the injection and at short intervals after the injection has been discontinued, since there is a rapid compensation on the part of the organism with a return to normal of the catalytic activity of the blood. For example, 20 cc. of 5 per cent bicarbonate of soda solution causes a marked fall in the activity of the blood which is rapidly recovered from (1 to 5 minutes after the injection has been discontinued) and then a much more marked fall in the activity followed by a much longer time for compensation occurs after 6 cc. of the same salt. This continues on further injections until compensation is lost and death ensues. It is possible on this basis to construct a hypothetical explanation for the decline of the catalase in nephritis and uræmia (3).

Further studies on the relation of various organs to the catalytic activity of the blood were made with these results. After the extirpation of many organs there is a transient fall in the catalytic activity of the blood. The fall is permanent after extirpation of the thyroid, but is compensated if thyroid be fed (4).

During the above experiments it was found that following an acute peritonitis there may be a sharp rise in the catalytic activity of the blood. This rise usually occurs within 6 hours after the peritonitis is produced, and may continue for several days. The curve of activity is entirely independent of that of the body temperature or white blood count, but corresponds to an increased number of erythrocytes (5 and 6).

From the above experiments several factors influencing the catalytic activity of the blood can be deduced, namely the number of red blood cells, the function of the thyroid and kidney, and the action of salts, acids, and alkalies.

Clinical Application of the Test (7).

Method.—.025 cc. of blood is removed from the lobe of the ear in a pipette. This is diluted in 10 cc. of water; 5 cc. of this dilution suffices for a test. It is placed in a 100 cc. bottle in which there is also a vial with 5 cc. of neutral hydrogen peroxide. The large bottle is connected with a gas burette and then uniformly agitated in order to bring the blood and hydrogen peroxide in contact. The amount of oxygen liberated is measured over a given period of time (15 seconds). The procedure requires only a few minutes, the error is slight and no precautions beyond ordinary room temperature and clean apparatus are necessary.

A series of 100 normal individuals of different age and sex were first studied; 80 per cent of these vary within physiological limits, i. e., 5 cc. of a 1-400 dilution of their blood will liberate from 13 to 17 cc. of oxygen from 5 cc. of neutralized 3 per cent hydrogen peroxide in 15 seconds. In the other 20 per cent the amount of oxygen liberated varies within wide limits, 12-22 cc. These variations are independent of the number of red blood cells and hemoglobin percentage. The explanation of this variation is at present not forthcoming. It is, however, of the utmost importance to bear it in mind when interpreting the activity of the blood in diseased conditions.

On the other hand the catalytic activity of the blood of a single normal individual is constant from day to day over long periods of time and in this way a base line can be obtained from which the significance of any change in the activity can be readily interpreted.

The Catalytic Activity of the Blood in Disease.

Typhoid Fever.—Fifteen cases were followed throughout their illness with the following results. During the early days of their illness there was no change in the catalytic activity of the blood, but towards the third week there was a gradual fall accompanying the anemia. During convalescence the activity became normal together with the red blood count.

Diseases of the Respiratory Tract including lobar pneumonia, tuberculosis, and empyema (12 cases). There is a slight decline in the catalytic activity of the blood during the course of lobar pneumonia. The relation of this decline to the crisis and the salt metabolism of this disease has not yet been determined. In other diseases of the respiratory tract there is no noteworthy variation in the power of the blood to split hydrogen peroxide except where the disease is accompanied by a severe anemia.

Acute Peritonitis.—In 4 out of 5 cases of acute peritonitis examined there was a characteristic rise in the catalytic activity of the blood. In one a reading had been made before the peritonitis occurred while in the other three the increased activity was confirmed by the decline to normal, following operation. In the one instance where no rise was obtained the reading was only made 20 hours after operation. In two cases of suspected peritonitis with high fever and leucocytosis the catalytic activity of the blood was normal, and in these cases the peritoneum was found clean at operation.

Diabetes Mellitus and Catarrhal Jaundice exert no influence upon the catalytic activity of the blood.

—Four cases. In diseases
the thyroid gland both hypo- and hyperthyreosis, the cata-
tic activity of a single patient's blood is not constant from
ıy to day. In hyperthyreosis the activity tends to increase
hile in hypothyreosis the activity assumes a level lower
ıan normal. This may be of significance in interpreting the
ındition of the thyroid gland where the signs and symptoms
:e atypical.

Renal, Cardiac and Cardio-Renal Cases.—Twenty-four cases.

Despite the presence of a marked nephritis provided there
:e no symptoms of renal insufficiency (uræmia) there will
ɜ no marked change in the catalytic activity of the blood.

2. Where there is a chronic nephritis accompanied by
ıdefinite symptoms of renal insufficiency the catalytic activity
f the blood will be irregular from day to day and will tend to
ssume a level lower than normal.

3. In acute mercurial nephritis there is a fall in the cata-
/tic activity of the blood.

4. With uræmic coma there is a marked fall in the catalytic
ctivity of the blood which is permanent if the coma ends
ıtally but which recovers should the coma disappear.

5. With retention of urine due to obstruction of the lower
rinary tract there is a marked decline in the catalytic activity
f the blood. This decline may persist for some time but
ıould the obstruction be removed the catalase will again rise.

Cardiac Cases.—Even in severe cardiac disease there is no
ignificant change in the catalytic activity of the blood. In
ɔme cases it is high. This may be normal for these individ-
als as it will be remembered some normal individuals have a
igh activity. In no single case was the activity sufficiently
ecreased after many readings had been made to suggest renal
ısufficiency.

Cardio-renal Cases.—In three cases of cardio-renal disease
here the clinical findings suggested a renal insufficiency the
talytic activity of the blood was normal. At autopsy only a
ronic passive congestion of the kidneys, the result of a
compensated heart, was found.

Cerebral Hemorrhage.—In two cases of cerebral hemorrhage
ɜ catalytic activity of the blood was high. Whether this is
increase over normal is not known but it is clear that the
;h reading would differentiate apoplectic coma from uræmic
na.

THE CATALYTIC ACTIVITY OF THE BLOOD IN PREGNANCY.

Neither pregnancy nor labor have any appreciable effect upon the catalytic activity of the blood. Ten cases.

The toxæmias of pregnancies accompanied by coma and convulsions can be differentiated into two groups by the determination of the catalytic activity of the blood.

1. Cases where there is no change in the catalytic activity. These will include eclampsia without renal involvement. Seven cases.

2. Cases with decreased catalytic activity; three cases. These will include:

a. Chronic nephritis where the excessive work thrown on the kidneys by the fœtus will bring about renal insufficiency.

b. Eclampsia, etc., with marked renal involvement. The significance of this differentiation in the prognosis for future pregnancies is clear. In the first group future pregnancy may be normal. In the second it will most likely be complicated by a toxæmia, the result of renal insufficiency.

MALIGNANT DISEASE AND DISEASES OF THE HÆMATOPOIETIC SYSTEM.

The results are still too meagre to be of value.

The interpretation of the clinical results is entirely dependent upon the experimental work, and in many places will probably be unsatisfactory. The number of cases is likewise too few to allow of anything but broad conclusions. It seems, however, that the work will be of value in the study of the oxidative phenomena of the blood, in further detail than is allowed from the enumeration of the red blood cells and the determination of their hemoglobin content.

REFERENCES.

1. M. C. Winternitz and C. R. Meloy: Jour. of Exp. Med., 1908, Vol. 10.
2. M. C. Winternitz: Jour. of Exp. Med., 1909, Vol. 11.
3. M. C. Winternitz and W. B. Rogers: Jour. of Exp. Med., 1910, Vol. 12.
4. M. C. Winternitz and J. P. Pratt: Jour. of Exp. Med., 1910, Vol. 12.
5. M. C. Winternitz and J. P. Pratt: Jour. of Exp. Med., 1910, Vol. 12.
6. M. C. Winternitz: Not yet published.
7. M. C. Winternitz, G. R. Henry and F. McPhedran: Arch. of Int. Med., not yet published.
8. M. C. Winternitz and F. C. Ainley: Am. J. Obst., 1910, Vol. LXII.

THE JOHNS HOPKINS HOSPITAL BULLETIN.

he Hospital Bulletin contains details of hospital and dispensary practice; abstracts of papers read and other proceed-
of the Medical Society of the Hospital, reports of lectures, and other matters of general interest in connection with
work of the Hospital. It is issued monthly. Volume XXII is now in progress. The subscription price is $2.00
year.

'oreign postage, 50 cents.) Price of cloth-bound volumes, $2.50 each.

complete index to Vol. I-XVI of the Bulletin has been issued. Price 50 cents, bound in cloth.

DISTOMA PULMONALE IN WISCONSIN.

By **Henry Hanson**, M. D.

(*From the Pathological Laboratory of the Milwaukee County Hospital.*)

The finding of lung flukes (Distoma Pulmonale, or Paragonimus Westermanii) is of such rare occurrence and great importance that it seems to me the case in question should be reported. Up to the present time there appear to be only three specific cases in which this parasite has been found in domestic animals in this country. One case has been reported for man, an imported case seen in Portland, Oregon. In the March (1908) number of the *Denver Medical Times* and *Utah Medical Journal*, E. W. Lazell reported a case of "Cysticercus cellulosæ and Distomum pulmonalis in Brain, with Exhibition of Specimens." This paper deals so briefly with the case, and the description of the parasites is so incomplete that one can hardly feel satisfied to class them with the group of parasites known as the Paragonimus Westermanii, and yet the paragonimus is the only fluke which is known to get into the brain.

Up to the present time the disease has been unknown in the State of Wisconsin. The only two other States previously known to have these parasites are Michigan (Ann Arbor) and Ohio (Columbus and Cincinnati). In Ann Arbor the fluke was found in the lung of a cat and was sent to Dr. H. B. Ward of the University of Nebraska, who identified the parasite and wrote the first report of the presence of this lung fluke in the United States. The parasites were later sent to Stiles of the Department of Zoology, Public Health and Marine Hospital Service, U. S., who confirmed Ward's diagnosis and pronounced them identical with the Paragonimus Westermanii. In the second case the lung fluke was found in a dog in Columbus, Ohio, by Kellicott, who also referred this specimen to Ward. In the third instance the lung fluke was found in hogs slaughtered at the abattoirs in Cincinnati, Ohio. These cases cited, together with the finding of the disease in a cat and also two of her kittens (kittens born in the village of Wauwatosa, Wisconsin), add further proof of the endemic theory of the infection. This means that we have a new parasite to deal with. The reason this parasite has not been discovered before is most likely due to the fact that it has not been looked for extensively. There is no doubt in my mind that there are cases of this disease in human beings which have been overlooked simply because an infection of this kind has not been known to exist.

This parasite, as is well known to those who have had occasion to look up its history, is a particularly unwelcome one. It is especially important that medical men should be on the lookout for possible cases of this infection, parasitic hæmoptysis, which are probably called incipient tuberculosis on account of the obscurity of the physical lung findings. The scattered distribution of the cases referred to would also indicate that the parasite is quite firmly established and that it is more common than is generally known. The first finding of the parasite dates back to 1893, the first report by Ward to 1894. Other reports have appeared at intervals, which references will be given at the end of this paper.

The present paper is especially concerned with the finding of lung flukes in two autopsied cats in Wauwatosa, Wisconsin.

I am indebted to Mr. Edwin Hirsch, of Wauwatosa, W for the opportunity of making this study, since it is through his interest in the case that the parasite was discovered. He first noticed that one of the cats owned by the family was coughing and in order to determine the cause of the cough he killed and dissected the cat. Later when a second cat began to show symptoms it was brought up to the laboratory of the Milwaukee County Hospital where the cat was chloroformed and autopsied.

HISTORY OF CAT.*

Case I.—The first case of lung flukes to come under our observation was that of a female cat. Early in the spring of 19 she with three other kittens was found under an old lumber pile. The other kittens were taken away, but this one was kept and grew up as a family pet. After she had become somewhat more than a year old, we noticed that she had a very peculiar cough. This was not clear and free, but rather close and choking. We at first thought little of the matter and permitted the cat to remain a pet. The cough gradually grew worse and the cat seemed to lose weight. As we did not deem it well to have a sick cat as a pet we concluded to dispose of her. During the Christmas holidays of 1908 the cat was chloroformed and autopsied. The lungs at their apices were of normal color, but at their bases colored nodular areas were to be seen. Upon cutting into one of these areas we were greatly surprised to find two parasites contained therein. Upon opening the other cysts, for now it was evident that these dark colored nodules were such, other pairs of parasites were found. In all there must have been 6 or 8 different cysts and each contained two parasites.

Case II.—The second case of lung parasites was also in a female cat. The cat, a kitten of the cat in the first case, was born on March 25, 1908. When but a few months old she also gave indications of a throat or lung trouble by a choking cough. This gradually became more marked and the cat grew thin. Finally she had several hemorrhages and then she was chloroformed, and autopsied on Easter Sunday, 1909, in the Pathological Laboratory of the Milwaukee County Hospital.

Anatomical Findings.—With the exception of the lungs the findings were negative.

Lung of Cat.—The upper lobe of the lung is of salmon red color, crepitates and shows no infiltration except in the lower part where a few areas of induration can be seen which somewhat resemble tuberculosis nodules. The nodules vary in size. In the lower lobe there are more of these areas, some of which are from 1 to 2 mm. or more in diameter. These have a semitranslucent appearance, and are of an opaque grayish-white color. Other areas in the lower part of the lower lobe are of a dull dirty brownish-gray with a yellowish-green tinge in the underlying tissues. Along the mediastinal portion there are more of these grayish, dull, semitranslucent areas. In the lower part of the and a more voluminous earance in the lung. On section one cuts into a definite cyst ch contains two lanceolate bodies somewhat coffee-bean ed, but the blunter head end differs from the narrower end and thus to some extent destroys the analogy of the e-bean. The fluke resembles the larva of the potato bug sal surface). The flukes each have a rounded dorsal and a ened ventral surface.†

---

* History written by Edwin Hirsch, Wauwatosa, Wis.

ne flukes in this case measured 11 mm. long by 4 to 4.5 mm. and in the fresh live condition about the same in the dorsoral diameter. On inspection one can see dark, blackish-blue s which, as I have found on further study, are the internal organs such as uterus and intestines. One of the flukes was cut accidentally and as a result secreted a dark biliary, viscid-looking fluid substance. Color of flukes, a reddish-brown. On section of the lung one finds a more or less infiltrated appearance, with nodules of varying size. The cut surface in such areas has a yellowish appearance and smears from these areas reveal a large number of eggs with a chitinous yellow shell. The smears are obtained by simply drawing a slide across the fresh lung surface. These eggs are oval, one end blunter than the other, the blunter end has a definite operculum. Within the eggs are found varying pictures. Some seem to be simply an empty shell while others have a definite yolk or nuclear structure in the center of the egg mass. The eggs with the yolk mass also contain some cells which have the appearance of endothelial cells, but have a very granular protoplasm, almost resembling the granules of the *Herzfehlerzellen.*

Microscopic Findings.—Section, stained with hæmotoxylin and eosin, taken through the fibrous cyst with some of the surrounding lung tissue. In the gross this shows a fibrous capsule about the parasites, about 1 mm. thick with a dense surrounding infiltrated tissue. Microscopically this is found to be composed of whorls of fibrous tissue with some round, spindle and fibroblastic cellular infiltration. The picture is that of a chronic inflammation resembling a fibrous pneumonia. In the center of this cyst there are some organizing blood clots and an accumulation of round cells, other leucocytic cells, and here and there an occasional egg. Outside of this cyst wall one sees a dense pneumonic infiltration, of endothelial, round and polymorphonuclear cells, also giant cells. Within the eggs one finds in many instances a nuclear cleavage, probably the beginning development of the egg. Such a theory has already been advanced by one writer and discredited by others. Nevertheless such is the picture which is found in the eggs in the sections from this case. The section also shows empty shells of eggs. The significance of this cannot be definitely stated. The eggs of other flukes are not known to develop and liberate their ciliated embryos in the tissues.

Among other flukes which occur and may be pathogenic for man are the following: Liver flukes (Fasciola hepatica, Fasciola gigantica), and the Venal Distoma (Schistosoma hæmatobium), the latter is also known as Bilharzin, the disease, Bilharziosis or Egyptian Hæmaturia. The Schistosoma is a very rare parasite in this country and not more than six or seven cases have been reported. The last of these reports which I have seen is "Parasites Found in New York City, Archives of Internal Medicine, September 15, 1908, Vol. 2, No. 2, by H. S. Patterson." Other flukes have also been reported, e. g., Ward in 1895 reported "The European Cat Fluke, Opisthorchis felineus," from cats in Nebraska. This fluke, however, infests the gall ducts of the domesticated cat, and is not found in the lungs.

Clinical Diagnosis.—Diagnosis of lung fluke infection can be made by examining unstained specimens of sputum from suspected cases. The finding of large, yellowish, oval eggs should at once make the diagnosis. There are no other eggs the size and shape of the lung fluke eggs which are likely to be found in the sputum. "The eggs are always present and constitute the only constant specific character." Stiles (Osler's Modern Medicine) estimates that as many as 12,000 eggs may be expectorated in a single day. The cough is at first a hard, dry, chronic cough. The sputum is said to have a peculiar odor, probably due to the blood which it contains, and is of a rusty color.

"The lethality has not been determined but probably varies with the intensity of the infection." (Stiles, *l. c.*)

The lesson to be drawn from finding this parasite in this vicinity and other parts of the country is that there may be

---

or a detailed description of the parasite I will quote from trated Key to the Trematode Parasites of Man. Bulletin, 17, Hygienic Laboratory, Treasury Department, Washington, .

YPE SPECIES PARAGONIMUS WESTERMANII (KERBERT, 1878).

Asiatic Lung Fluke—PARAGONIMUS WESTERMANII—(Kerbert, 1878)—Stiles & Hassall—1900 of Man.

pecific Diagnosis.—Paragonimus: 8 to 16 mm. long (after cott 15 to 20 mm.), 4 to 8 mm. broad, 2 to 5 mm. thick; p pinkish to reddish-brown (alive), slate color when pred; live specimens are depressed and with a variable outpreserved specimens often oval to elongate pyriform, transsection round or nearly so, anterior end bluntly rounded, rior end less blunt. Oral sucker 0.53 to nearly 0.75 mm. kart) or more; 0.864 by 1.017 mm. or 1 to 1.4 mm. (Ward); 0 to 1.12 by 0.83 mm. (Stiles and Hassall); 0.78 mm. (Kerin diameter, terminal or subterminal in different specifrom the same lung. Ventral acetabulum 0.6 to at most mm. (Leuckart); 0.78 mm. (Kerbert); 0.75 to 1.017 mm. d); 0.88 to 1.2 by 0.86 to 1.44 mm. (Stiles and Hassall) very ly larger than oral sucker. Skin provided with broad scalepines. Pharynx elongate; esophagus very short so that the ation of the intestines is considerably anterior of the l acetabulum; intestinal ceaca usually somewhat zigzag distance from each other run irregularly to posterior end. l pore, often indistinct, close to caudal margin of ventral ulum, may be in the median line or immediately to right of it. Male organs: Cirrus or cirrus pouch absent; ductus atorius is straight; testicles tubular, ramified, one slightly ior of the other on each side of the median line. Female : Ovary branched lateral, right or left of medial line, hat posterior of acetabulum and anteroventral of transvitello-duct; on the opposite side of median line and at the same height is situated a lobate shell gland and a short massed uterus: in some specimens the latter may across the median line and partially cover the ovary; f uterus extend ventrally of shell gland; vitellaria marhighly developed, extending anterior to posterior ex, often leaving but a small portion of the dorsal and median fold uncovered; transverse vitello-ducts dorsal; e reservoir large; Laurer's canal present. Eggs oval, 00 μ long by 56 μ broad (Leuckart); 96 to 118 μ long by 3 μ broad (Ward); 68 to 96 long by 48 to 60 μ broad and Hassall); yellow shell. Miracidium ciliated, deafter eggs leave host. Sporocyst, redia, cercaria, and diate host undetermined.

tat.—Lungs and brain (occasionally in other parts of), royal tiger (Felis tigris), domesticated cat (Felis catus ata), domesticated dog (Canis familiaris), swine (Sus omesticata) and man (Homo sapiens).

raphic Distribution.—China, Japan, Formosa, occasional cases in Europe, some cases of endemic infection in the tates."

more of them in persons suffering from vague pulmonary symptoms, and that the physicians should always be on the lookout for them, especially where the parasite is now positively known to exist. All efforts should be made to determine, if possible, the mode of infection. So far the secondary host for these lung parasites has not been determined. All the writers upon this subject discredit the theory of direct transmissibility from one animal to the other of the same species. It would be contrary to all analogy. In the cases in question, where the mother cat had the infection and both of her kittens later developed the infection, one can explain the transmission by the fact that the mother and kittens ate of the same food.

In connection with the discovery of this case, the query, are we in danger of the spread of the infection among human beings? is a pertinent one. What danger are we in from eating raw vegetables in infected districts? May not some of our obscure pulmonary cases which have been diagnosed as tuberculosis be, truly, lung fluke infection, especially where the symptoms are not severe and where one is unable to find the tubercle bacilli in the stained sputum.

REFERENCES.

1. Stiles, C. W.: Hygienic Laboratory. Bulletin No. 17, Aug. 1904. Illustrated Key to Trematode Parasites of Man, p. 14-18.
2. Stiles, C. W.: U. S. Department of Agriculture, Bureau of Animal Industry. Notes on Parasites, 50-52. (Reprint from 16th Annual Report of the Bureau of Animal Industry (1899). Issued Dec. 31, 1900.)
3. Ward, H. B.: Ueber das Vorkommen von Distoma Westermanii in den Vereinigten Staaten. Centralbl. f. Bakteri. u. Parasitenk., 1894, XV, 362-364.
4. Ward, H. B.: The Asiatic lung-distome in the United States. Med. News, Phila., 1895, LXVI, 236-239.
5. Ward, H. B.: A second case of Distoma Westermanii in the United States. Vet. Mag., Phila., 1895, II, 87-89.
6. Lazell, E. W.: Cysticercus cellulosæ and Distomum Pulmonalis in Brain. Denver Med. Times, 1908-9, XXVIII, 432-4

BLOOD PLATELETS AND MEGALOKARYOCYTES IN HODGKIN'S DISEASE.[1]

By C. H. Bunting, M. D.

(From the Pathological Laboratory of the University of Wisconsin.)

During the progress of a clinical and pathological study of Hodgkin's disease, which has been undertaken by the author in conjunction with Dr. J. L. Yates, of Milwaukee, certain features of the blood picture have been observed which seem worthy of note. They are of constant occurrence in the disease and appear characteristic of it. Before describing them it seems best to define the condition designated Hodgkin's disease so that there may be no confusion regarding the cases in the mind of the reader. The term is used in the sense of Reed, Longcope and Simmons to denote a non-tuberculous disease most common in young males (though by no means confined to them) characterized by a progressive enlargement of the lymph-glands, by a tendency to an anæmic state, by certain pressure symptoms and by a fatal termination, usually within a period of from three to five years. The lesion in the lymph-glands shows a progression from a hyperplastic cellular stage to a final condition of sclerosis. According to the terse and accurate description by Longcope[2] there is "an early increase in the lymphadenoid tissue with later proliferation of endothelioid cells, formation of uninuclear and multinuclear giant cells, thickening of the reticulum and a final overgrowth of connective tissue. Eosinophiles, though not specific, are frequently found in great abundance." To this might be added the fact that the architecture of the gland is early destroyed.

My first opportunity to study the blood of a Hodgkin's patient came at a time when I was engaged in an experimental study of the origin and of the relations of blood platelets and my attention was attracted by the remarkable platelet picture in the blood smears from the patient (Case I). The blood platelets of the smear were very well preserved and, stained by Wright's stain, showed the characteristic clear blue protoplasm with sharply cut border and with the central group of metachromatic purplish granules. The platelets were exceedingly numerous. In fact I could not recall having seen any blood smear in which the number of platelets equalled that seen in this. In addition to this increase in number there was a striking variation in their size and shape. Many were round and approached the size of a red blood corpuscle. Oval forms also were found, from 15 to 20 μ in length and from 7 to 10 μ in width. Others took the form of pseudopodia of about 4 μ in width and from 20 to 30 μ in length. From the sharpness of outline of these forms and the arrangement of their granules there was no question of their being due to the fusion of platelets. The picture was entirely different.

At a subsequent visit from the patient, who had in the intervening four months been under treatment with the X-ray, the same striking picture was present in the blood smear, and a count of the platelets by the Pratt method showed their number to be 1,140,000 per cmm.

Since seeing this case I have had opportunity to examine blood smears from eight other cases and to count the platelets in two of them. It does not seem necessary to report the cases in detail at this time, as clinical reports of the majority of them will be made in a subsequent paper. In addition to

---

[1] Paper read before the Association of Pathologists and Bacteriologists, May 3, 1910.

[2] Bull. Ayer Clin. Lab., 1903, No. 1, p. 4.

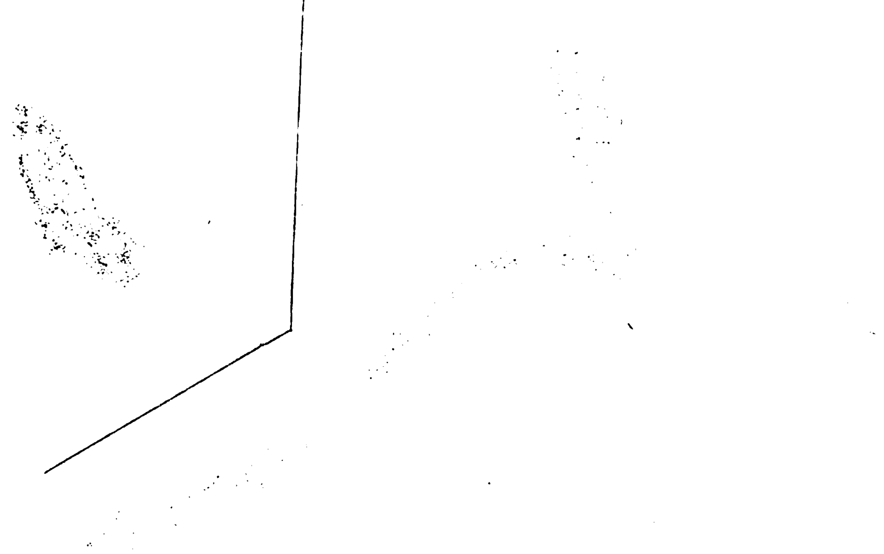


FIG. 1.

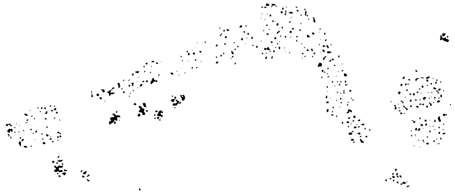


FIG. 2.

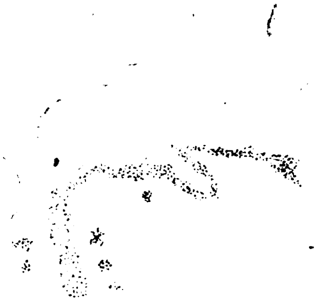


FIG. 3.

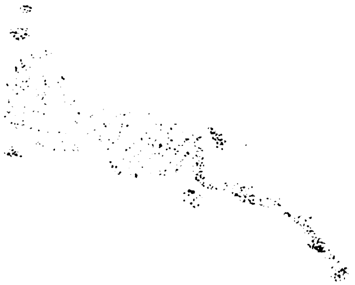


FIG. 4.

given it should be said that with one exception (Case VII) the clinical diagnosis of Hodgkin's disease has been confirmed by the examination of a gland removed for that purpose. The cases are briefly as follows:

Case I.—Nov. 20, '08 (Dr. Yates). Male, white, 21 yrs. Onset in July, '08. Cervical and axillary glands involved. Oct. 30, '08, gland removed for diagnosis showed early Hodgkin's changes.
Nov. 20-08. R. b. c., 5,304,000; w. b. c., 7500.
Mar. 4-09. R. b. c., 4,968,000; w. b. c., 4800; platelets, 1,140,000.
June 11-09. R. b. c., 5,600,000; w. b. c., 7000; platelets, 475,000.
Feb. 16-10. R. b. c., 5,800,000; w. b. c., 7000.

Case II.—Nov. 10, '08 (Dr. Yates). Male, white, 10 yrs. Large mass of discrete glands in left cervical region of at least one year's duration. Test gland showed well-marked Hodgkin's picture. Glands removed at operation Nov. 10, '08.
Apr. 1-09. R. b. c., 4,712,000; w. b. c., 9500; platelets, 750,000.
Jan. 22-10. R. b. c., 5,250,000; w. b. c., 9600.
Oct. 8-10. R. b. c., 4,960,000; w. b. c., 9800; Von Pirquet test neg.

Case III.—Apr. 1, '09. Male, white, 30 yrs. Seen two weeks after second operation for enlarged glands of neck. First operation six months previous at Rochester. Diagnosis Hodgkin's disease.
Apr. 1-09. R. b. c., 4,560,000; w. b. c., 10,000; platelets, 720,000.

Case IV.—Feb. 5, '10 (Dr. Tupper, Eau Claire, Wis.). Female, white, 40 yrs. Eight months previously right inguinal glands began to enlarge. Two months later left inguinal and left axillary glands; four months later left cervical glands and one in right cervical region. Test gland showed advanced Hodkgin's lesion.

Case V.—Nov. 9, '09 (Dr. Yates). Male, white, 8 yrs. Swelling of cervical glands began five months ago; on date left inguinal glands also enlarged. Test gland showed early hyperplastic stage of lesion.
Nov. 9-09. W. b. c., 9900.
Jan. '10. Left cervical group of glands removed.
Feb. 26-10. R. b. c., 5,000,000; w. b. c., 5000.
Oct. 8-10. Von Pirquet test negative.

Case VI.—Mar. 10, '10 (Dr. Sullivan, Madison). Male, white, 16 yrs. Marked involvement of left cervical glands. Had been noted for only one month. Examination of test gland suggested greater duration, from the sclerosis and advanced condition of the lesion.
Mar. 10-10. W. b. c., 18,000.

Case VII.—Jan. 5, '10 (Dr. Bennet, Oregon, Wis.). Female, white, 64 yrs. Onset in inguinal glands, March, 1909.
Oct. 24-09. General glandular enlargement with clinical diagnosis of Hodgkin's disease.
Jan. 5-10. R. b. c., 3,200,000; w. b. c., 4450.
June 30-10. Death from exhaustion and anæmia.

Case VIII.—(Dr. Yates). Male, white, 33 yrs. Onset in March, '07 with supraclavicular glandular enlargement.
Sept., '08. Left supraclavicular and left axillary glands most enlarged. Some enlargement in right cervical, axillary and inguinal region.
Oct. 30-08. Excised gland shows typical and advanced Hodgkin's lesion.
Jan., '09. Blood smears examined.
May 20-09. Patient died.

Case IX.—Oct. 3, '10 (Dr. Yates). Male, white, 5 yrs. Left cervical glands markedly enlarged. Five months duration. Test gland shows marked Hodgkin's changes.
Oct. 3-10. R. b. c., 4,800,000; w. b. c., 4200.

In the two cases in which the platelet count was made (Cases II and III) the counts were as noted, 750,000 and 720,000 respectively, numbers which are well above the limits ordinarily given as normal. While three counts form a limited number on which to base a statement that the platelets are increased in Hodgkin's, I am relying also on the appearance of the stained smears from the six cases uncounted. Comparison of these six with blood smears from the three cases counted and with smears from normal individuals shows that in the Hodgkin's cases there is a definite increase in the platelets. There was no exception to this finding in the series. Furthermore, as constant as this finding, is that of platelets of unusual size and of the pseudopodia-like masses. These latter have varied much in size and shape, the longest approximating 50 μ in length. Their staining is identical with that of the platelets. The distribution of granules and the sharp borders preclude the possibility of their being fused platelets. Their general character can best be indicated by reference to the camera lucida drawings of a few specimens shown in Figures 1-4. My experience with these cases leads me to believe that these masses and pseudopodia are so frequent that one can scarcely fail to find them in any smear from an active case of Hodgkin's disease. On the other hand, in searching for them in the blood of normal individuals, I have found but one small pseudopodium in a careful examination of blood smears from fifteen individuals.

The question naturally arises: What is the nature of these masses which take the platelet stain? I have spoken of them as pseudopodia as I find they are identical in form and staining reactions with the specimens of Wright and with the figures published in his demonstration of the origin of platelets from the megalokaryocyte pseudopodia.[3] Further, as I have indicated in a previous paper,[4] I have been able to confirm Wright's findings in the rabbit and have found similar pseudopodial masses in the capillaries of the bone marrow and of the lung. I think it can be stated definitely, therefore, that these masses of platelet nature observed in cases of Hodgkin's disease are masses of megalokaryocyte protoplasm and of unconstricted pseudopodia of the same.

In an attempt to explain why these pseudopodia should be found in the peripheral blood stream in such numbers, while they are very infrequent in the peripheral blood of normal individuals, my attention was directed by previous experimental work to the lungs. Investigations carried on upon the rabbit had shown that when platelets are being rapidly produced megalokaryocytes in considerable numbers leave the bone marrow. A majority of these are held up in the lung capillaries where their nuclei form thrombi, while their protoplasm is stripped off and forms the pseudopodial masses and the large forms of platelets found in the rabbit in this condition of rapid platelet production. Other megalokaryocytes slip through the lung and may be found in other organs, particularly in the spleen and in the liver.

---

[3] J. Morph., 1910, XXI, 2.

[4] J. Exp. Med., 1909, XI, 541.

Through the kindness of Dr. W. H. Welch and of Dr. W. T. Longcope I have been able to examine the lungs of four cases of Hodgkin's disease from the pathological collection of the Johns Hopkins Hospital, and the tissues, including the lungs, from seven autopsy cases from the Pennsylvania Hospital. In none of these eleven lungs, in sections taken from parts uninvolved by the disease, were megalokaryocyte nuclei lacking. In four of the eleven cases they were much more numerous than ever found to be in the human lung in cases of marked leucocytosis, in which their presence to some degree is constant. It is impossible to give exact mathematical values to the numbers in the various lungs because of the varying alveolar expansion in the different specimens. An idea of their frequency may be gained, however, from the statement that in one lung, that of autopsy A-324 (Penn.), no field of moderate magnification (Zeiss: obj., 8; oc., 8) showed absence of megalokaryocytes and the number in such fields varied from three to twelve. Examination of sections of other organs revealed an occasional megalokaryocyte nucleus in the capillaries of liver and spleen—but in no case were they numerous.

That these megalokaryocytes in the lung capillaries come from the bone marrow seems to me certain. There is but one other remote possibility. Examination of a considerable series of gland sections from cases of Hodgkin's disease from a variety of sources, shows that in well advanced cases there is present in the glands, besides the endothelioid giant cells, a type of giant cell indistinguishable from the bone marrow megalokaryocyte. Whether these giant cells are formed *in situ* or are bone marrow giant cells is undetermined. If they should escape into the lymphatics they would also be held up in the lungs. Yet they are so soon enclosed in a fibrous network that their escape in any such numbers as indicated by the lung sections appears improbable. Furthermore a study of bone marrow sections from five of the Pennsylvania series of autopsies seemed to show a definite increase in megalokaryocytes in three. In one was noted an unusual number of small megalokaryocytes, the young forms, showing an activity in this type of tissue in the marrow. All these features with the analogy of the rabbit findings leave, I think, no question as to the origin of the giant cells found in the lungs.

One other bone marrow feature was of interest. In addition to a more extensive pyknosis of giant cell nuclei than is commonly seen, in four of the five marrows was found karyolysis in these cells. This was most marked in a marrow in which there was necrosis of other marrow elements (Penn. Aut. 523), but occurred in the other three marrows where no necrosis of other elements was noted.

In conclusion the findings here presented would seem to indicate that in Hodgkin's disease there is a special activity of the platelet-producing elements resulting in the production of large numbers of platelets and in the emigration of megalokaryocytes in large numbers from the bone marrow. In the lung capillaries these latter are stripped of their protoplasm, which appears in the peripheral blood stream in the form of the masses and pseudopodia described. What part this increased platelet production plays in the disease, I am unable to say. There is in the findings a suggestion that the toxin of the disease acts as sharply upon the megalokaryocytes as upon the lymphoid elements, leading eventually to their necrosis.

These findings are further submitted as additional evidence of the genetic relation between megalokaryocytes and blood platelets.

DESCRIPTION OF FIGURES.

Pseudopodia and megalokaryocytic protoplasm masses from Cases II, IV, V, VII. The figures are camera lucida drawings with the same magnification. The variation in size of the red cells is attributable to variation in the tension under which the smears were spread. In two cases (Figs. 1 and 3) the coverslip method was used in making the smears, in the other two (Figs. 2 and 4) the slide method.

PRIMARY GENERAL PERITONITIS WITH ISOLATION OF THE *BACILLUS LACTIS AEROGENES* IN PURE CULTURE FROM THE PERITONEAL EXUDATE.

By John W. Churchman, M. D.,
Resident Surgeon, The Johns Hopkins Hospital.

Interest in the capsulated group of bacilli (*B. mucosus capsulatus*) has largely centered in the discussion as to the identity of the different members of the group with one another. On this single point a large literature has sprung up, but the question is still to be regarded as only approximately settled. Friedländer's[1] announcement of the discovery of his organism was promptly followed by publications reporting similar, but not identical organisms. These included the rhino-scleroma bacillus (Fisch, Paltauf, and Eiselsberg), the ozaena bacillus (Loewenberg and Abel), the *B. lactis aerogenes* (Escherich) and many others (Fasching, Pfeiffer, von Dungern, etc.). Indeed, Ficke was able to collect from the literature, twenty-two varieties of the organism to which Fraenkel has given the collective name *B. mucosus capsulatus*. There have been many efforts to simplify the matter by showing the identity of some of these forms with one another and reducing them to a few group types. Unfortunately this has not proved an easy matter. Nor has it been possible to simplify the question by applying the serum tests; for all attempts at agglutination have so far failed (Landsteiner[2]).*

*** Von Eiseler and Porges (Centralbl. f. Bakteriol., 1906, XLII, p. 660) claim to have differentiated the ozaena bacillus and rhino-scleroma bacillus from the bacillus of Friedländer by agglutination and precipitation with immune sera.**

be said to be complete agreement on the subject the conclusions of Wilde represent approximately the majority opinion of bacteriologists; and they have the very great value of standardizing these organisms so that intelligible description of the various forms is possible.

Wilde[3] assembles the numerous varieties of the *B. mucosus capsulatus* under five type groups with the following distinguishing characteristics:

1. Type: *B. lactis innocuus.*

Raised, rounded, porcelain-like colonies on gelatin plates, or colonies like those of *Bact. coli.* No gas formation in glucose agar, alkali formation in milk-sugar bouillon, no coagulation of milk, no indol formation, grey-brownish growth on potato (without formation of gas), very slight pathogenicity for animals.

2. Type: Scleroma bacillus.

Mucoid, raised, colonies on gelatin plates, no gas formation in glucose agar, no (or very slight) acid formation in milk-sugar bouillon, no coagulation of milk, no indol formation, bright grey, translucent growth on potato (occasionally with acid formation), moderate pathogenicity for animals.

3. Type: *B. pneumoniae Friedländer.*

Raised, porcelain-like colonies on gelatin plates, gas formation in glucose agar, acid formation in milk-sugar bouillon, no coagulation of milk, no indol formation, creamy yellowish growth on potato (usually with marked acid formation), moderate or great pathogenicity for animals.

4. Type: *B. aerogenes.*

Raised, or flat, colon-like colonies on gelatin plates, abundant gas formation in glucose agar, acid formation in milk-sugar bouillon, coagulation of milk, no indol formation, abundant growth on potato (with gas formation), marked pathogenicity for animals.

. Type: *B. coli immobilis.*

Flat, colon-like or raised colonies on gelatin plates, gas ormation in glucose agar, acid formation in milk-sugar ouillon, coagulation of milk, formation of indol, gas formaon on potato variable, moderate or marked pathogenicity for nimals.

From this it will be seen that the bacillus of Friedländer not regarded as identical with the bacillus of scleroma it is distinguished from it by its ability to form gas in ucose agar; nor with the *B. lactis aerogenes,* which has the wer (not possessed by the bacillus of Friedländer) of agulating milk. Wilde recognizes the existence of interediate forms; but thinks the attempt to distinguish them separate species unnecessarily confusing; and suggests se rather sharp distinctions as a useful basis for description. Strong[4] attempts even greater simplification by recogning only two groups, as follows:

. Friedländer Group: Easily stained capsules, in tissues exudates; pseudo-capsules occasionally in artificial media; gas production most abundant on saccharose; slightly less on glucose, little or none on lactose: *no coagulation of milk.*

2. Aerogenes Group: Capsules difficult to stain and inconstant; no pseudo-capsules in artificial media: more abundant and constant gas formation on all three media; *rapid coagulation of milk:* equal amounts of acid on all three sugars.

Grimbert and Legros[5] go even further, claiming that the bacillus of Friedländer and *B. lactis aerogenes* are identical. All forms of both bacilli which they examined coagulated milk in from forty-eight hours to five days; and they cite Denys and Martin[6] as having shown that the bacillus of Friedländer, even if unable to coagulate milk at first, may acquire this characteristic by successive passage through this media.

It will thus be seen that there is justification for regarding the various members of the capsulated group as nearly, if not quite, identical; but that if any distinction is to be made a capsulated bacillus which produces gas in glucose and coagulates milk should be called the *B. lactis aerogenes.** This has been my warrant for the name given to the organism here reported as found at operation in the exudate of a primary peritonitis.

Though the specific nature of the bacillus of Friedländer as the cause of croupous pneumonia could not be established, the pathogenicity of the capsulated group has long been recognized. For laboratory animals it has often been found fatal, though its variable virulence has been again and again emphasized. The discussions as to the distinctions between the various members of the group have rather overshadowed interest in its relation to human disease; but isolated reports of its occurrence in various pathological conditions have continued to appear. In 1895 Étienne,[7] a year later Hébert[8] and two years later Léon[9] collected the literature on this subject. None of these publications are absolutely complete; and several reports of the occurrence of a capsulated bacillus in human disease have since appeared.

The following table contains a complete list of the diseases from which the *B. mucosus capsulatus* has been isolated and thus renders the literature on its pathogenicity readily accessible:

TABLE.

Diseases from which the *B. mucosus capsulatus* has been isolated. The organism has been reported as the bacillus of Friedländer; but also as the rhino-scleroma bacillus, and the *B. lactis aerogenes.*

Aphthous stomatitis	(Cited in review by Étienne[7]).
Purulent rhinitis.	"
Rhino-scleroma.	"
Purulent parotitis.	"
Purulent dacryocystitis.	"
Ulcer of the cornea.	"
Phlegmon of the orbit.	"
Purulent otitis media.	"

---

* Or, *B. coli immobilis,* according to Wilde; the two are distinguished by the ability of the latter to form indol.

Bronchopneumonia (Cited in review by Étienne[7]).
Empyema (Dieulafoy[43] has reported pyopneumothorax due to gas-producing organisms, without any connection with the lung). “
Serous and purulent pericarditis. “
Simple and purulent meningitis. “
Angiocholitis. “
Pyelonephritis. “
Pyaemia. “
Septicaemia. “
Ulcerative endocarditis. “
Acute lobar pneumonia (Curry[10]).[a]
Gangrene of the lung (Fortineau[11]).
Membranous bronchitis (Léon[9]).
Osteomyelitis (Schlagenhaufer[12]).[b]
Abscess of the brain (Sachs[13]).
Pseudo-membranous angina (Hébert[8]).
Salpingitis (Schenk[14]).
Endomyocarditis (Josserand and Bonnet[15]).
Abscess of scrotum (Halban[16]).
Cystitis (Montt-Saavedro[17]).
Purulent conjunctivitis (Kiesentzki[18]).
Empyema of Antrum Highmorii (Howard[19]).
Epidemic exfoliative dermatitis (Russell[20]).[c]
Hemorrhagic sepsis (Blumer and Laird[21]).[d]
Hemorrhagic sepsis of new-born (von Dungern[22]).[e]
Typhus exanthemicus (Hlava[23]).
Cholecystitis (Christian[24]).
Bacteriuria (Wartburg[25]).[f]
Liver abscess (Ranzi[26]).
Peri-deferential abscess (Macaigne and Vauverts[27]).
Gastro-enteritis (Fricke[28]).[g]
Tonsillitis (Curry[29]).
General gaseous emphysema with gas cysts of brain (Howard[30]).[h]
Peritonitis.[i]

There is then, abundant justification for Hébert's claim that the bacillus of Friedländer must be included in “la catégorie des microbes à tout faire”; and that, along with the staphylococcus, the streptococcus, *B. coli communis*, and *B. pyocyaneus*, *B. mucosus capsulatus* must be regarded as a saprophyte which becomes an infectious agent when its virulence is increased or the resistance of the host diminished.

It is striking that in the lists, given by Hébert, and by Léon of pathological conditions caused by the capsulated bacillus, no mention is made of peritonitis; and it is certain that a peritonitis of this origin must be both relatively and absolutely, quite rare. The present case is unique in that the *B. lactis aerogenes* was grown from the peritoneal exudate during life in a case of primary peritonitis. The word “primary” is used in the sense of Flexner[31] who suggested this term for that interesting group of cases in which an “inflammation (usually diffuse) of the peritoneal cavity occurs without the mediation of any of its contained organs”; or without any operative or other interference. It may arise independently (spontaneous peritonitis) or may accompany infections in distant parts of the body. Twelve of the one hundred and six cases examined by Flexner at autopsy, were of this variety; and the condition, though a rare one, is well recognized by surgeons.

Onset of illness suddenly two weeks before admission; acute, severe abdominal pains with nausea but no vomiting; then continuous pain, with exacerbations. No jaundice. T. 105.5° F. P. 120. Leucocytes 17,000. Pelvic examination negative. Signs of general peritonitis. Diffuse exudate found in peritoneum at operation. No source found for the infection. Appendectomy, drainage. B. lactis aerogenes in pure culture from the peritoneal exudate. Blood cultures negative. Slow convalescence; pulmonary complication (probably tuberculosis). Recovery.

History.—The patient was an unmarried colored girl, eighteen years old, a nullipara, with normal menstrual, and negative previous history. Two weeks before admission she had been suddenly awakened by severe, knife-like epigastric pain. This soon subsided, but some abdominal pain had been present from the onset to the time of admission to the hospital; and there had been several returns of the acute paroxysms experienced on the first night of the illness. She had also complained of some pain in the left hypochondrium. She had never vomited, but had been slightly nauseated. No jaundice.

On admission, the patient was suffering intensely from abdominal pain. Temperature 105.5° F., pulse 120, leucocytes 17,000. The abdomen was uniformly distended and the respiratory movements greatly restricted throughout. No visible peristalsis. The left lower quadrant was free from tenderness, which was, however, present in the left upper quadrant. Very slight rigidity of the rectus and oblique muscles on the left side. There was definite tenderness throughout the right side—quite marked at MacBurney's point (where there was muscle-spasm), but so exquisite in the right upper quadrant and accompanied by such spasm of the rectus as to make further palpation here impossible. No mass could be felt anywhere. On percussion, dulness was made out in both flanks; the rest of the abdomen was tympanitic. The liver margin was about 1 cm. above the costal margin in the right mammillary line. There was a profuse vaginal discharge (containing Gram negative intra-cellular diplococci) and ulcers on the labia. The vulva was marital but pelvic examination was negative. An exploratory laparotomy was immediately done through a right rectus incision. A considerable quantity of turbid fluid was found free in the peritoneal cavity. The abdominal viscera were uniformly injected, but there was no fibrin present, though the serosa of the intestines was quite red and did not glisten. The appendix and gall-bladder shared in the general inflammation; but were otherwise normal. The Fallopian tubes were quite red, but not distended and no pus could be pressed from their fimbriated extremities. The appendix was removed and two drains placed in the pelvis. Two days after the operation the patient began to cough. Her temperature re-peritoneal symptoms gradually diminished; but signs and symptoms of lung involvement increased.

---

[a] The relation of the organism to pneumonia is here discussed.

[b] Streptococci were also found in the smears from this case; but the bacillus of Friedländer grew out in pure culture.

[c] The organism found was similar in many, but not in all, respects to the bacillus of Friedländer.

[d] The cultures were made after death.

[e] The bacteriological report is very deficient.

[f] Appeared with fever, chills and headache; symptoms left in three days; bacteriuria finally disappeared under urotropin.

[g] Organisms found in the stools; presence of B. Friedländer as normal saprophyte in the intestines doubtful; Fricke, Lembke, Germano and others were unable to find it.

[h] Perkins (J. Exp. M., Jan., 1901) reports a laboratory epizootic among guinea pigs, associated with emphysema of liver, spleen and kidneys, from which the *B. mucosus capsulatus* was isolated.

[i] These cases receive separate consideration below.

Blood cultures were done on two occasions, and were negative, as was also the Widal test.

One month after the operation she was transferred to the medical service. Her operative wound was then practically healed, her peritoneal condition negative; but there was a persistent cough with profuse, pale green muco-purulent expectoration. Her leucocytes were 12,600. Her respirations were rapid and shallow, expansion was limited over the left upper front; the percussion note was high pitched in the inter-scapular region, below the angle of the scapula, and in the lower axilla. There was also some impairment over the lower right lobe. The breath sounds were harsh over both fronts, enfeebled over the backs below the spines of the scapulae, but nowhere absent. Expiration was prolonged and numerous fine râles were heard. The patient gave a first degree positive reaction to tuberculin in the left eye. Repeated examinations of the sputum for tubercle cilli were negative. The Wassermann test was also negative. The patient slowly improved and was discharged with a normal nperature, though signs of lung involvement persisted.

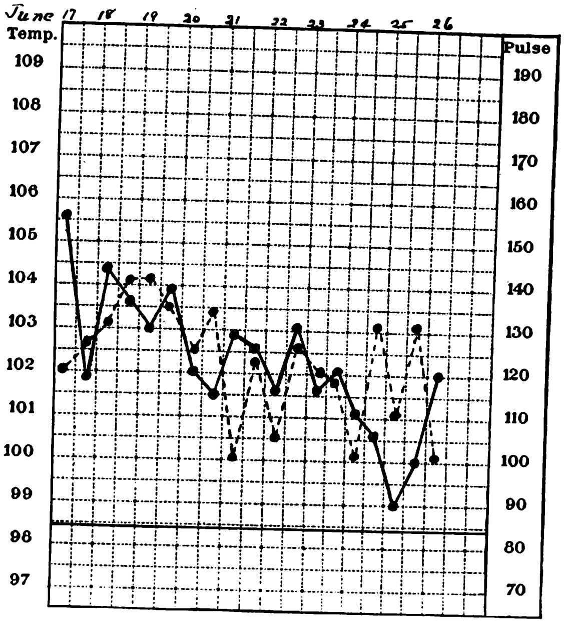


Chart for First Ten Days After Operation.
Solid line = temperature.
Broken line = pulse.

The accompanying charts (condensed from the regular tem- ature and pulse charts of the first and the final days of her ess), indicate the course of the disease.

Cultures made from the peritoneal exudate at operation owed an abundant, dirty whitish growth on agar. The ganism was a bacillus of varying size, non-motile and Gram gative. Capsules were readily stained. Gas was formed on ato and in glucose agar. After forty-eight hours, there acid formation in milk but no coagulation. Slight coagu- on occurred in five days; complete coagulation in nineteen s.

This finding, though rare, is not entirely without precedent. No one, however, has reported the organism from a primary peritonitis in cultures made during life.*

The cases of peritonitis, to be found in the literature, in which *B. mucosus capsulatus* was reported as the cause are the following:

1. Breinl [32]: Great hyperplasia of the lymphatics of the small intestine; death from intestinal perforation. In the pus a capsulated bacillus was found which was Gram negative but did not coagulate milk. It was pathogenic for white mice.

2. Fraenkel [33] reports the bacteriological findings (apparently at autopsy) in thirty-one cases.

The following members of the capsulated group were found:

B. lactis aerogenes.

1. Peritonitis from perforation of caecum.
2. Peritonitis with suppurative cholecystitis.

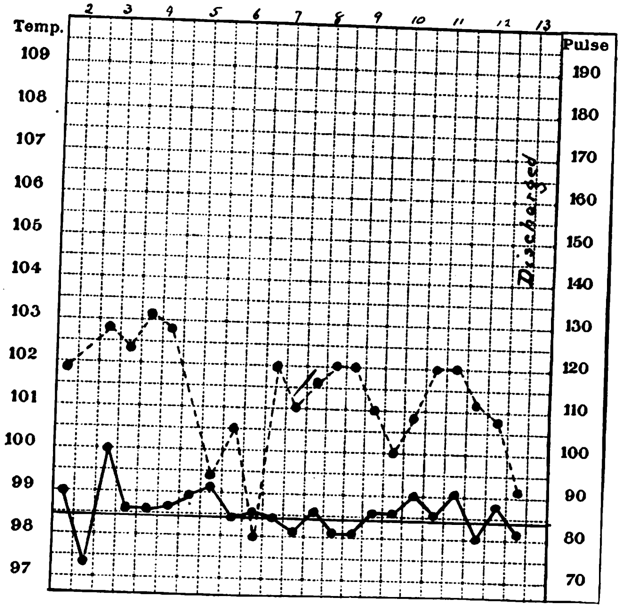


Chart for Last Days of Illness.†
Solid line = temperature.
Broken line = pulse.

B. lactis aerogenes with a *Diplococcus pneumoniae.*

3. Sero-fibrinous peritonitis with nephritis.

Organism resembling *B. lactis aerogenes.*

4. Purulent peritonitis with pyelo- and para-nephritis.

3. Howard [19]: a. Male dead after castration. Multiple abscesses of both kidneys; peri-rectal abscesses opening into cul-de-sac; fibrinous peritonitis. Cultures from peri-rectal abscess, peritoneum, heart's blood, spleen and renal abscesses

---

* There is good reason for supposing that all the cultures in Howard's cases were taken post mortem, though it is not, I think, definitely so stated.

† The high pulse throughout may have been accounted for by the enlargement of the thyroid which was present. There was also a definite tremor of the hands and a von Graefe's sign.

showed a capsulated bacillus, *which did not decolorize by Gram.* (Decolorization by Gram's method is an essential characteristic of this group of bacilli.)

b. Girl with chronic peritonitis; peritoneal cavity contained large amount thick, creamy pus from which a pure culture of the bacillus of Friedländer was obtained. (It is not stated that this culture was obtained post mortem; nothing said about appendix or tubes, or as to the origin of the infection.)

c. Man, dead of acute croupous pneumonia. Acute general fibrino-purulent peritonitis found. Cultures from pneumonic areas, peritoneum (and elsewhere) showed the bacillus of Friedländer.

d. Ranzi[26]: In the case of liver abscess already referred to (multiple liver abscesses, general peritonitis and endocarditis were found at autopsy), the bacillus of Friedländer was isolated in pure culture from the abscesses, the peritoneal exudate and the cardiac vegetations.

The rarity of this organism in peritoneal infections is illustrated by its absence from the series of one hundred and six post mortem examinations reported by Flexner.[31]

In addition to its other better known pathogenic properties the *B. mucosus capsulatus* is, then, to be thought of in connection with five groups of cases.

1. *Peritonitis.* Cases of Breinl, Fraenkel, Howard, Ranzi[a] and Churchman.[b]

2. *Hemorrhagic Sepsis* (Infectious purpura). Cases of Blumer and Laird, Howard,[34] Neumann,[35] von Dungern[22] [c] and Léon.[9]

4. *Liver Infections.* Cases of Ranzi, Canon,[36] [d] Wicklein,[37] [e] Kockel,[38] [f] Wright and Mallory,[39] [g] Clairmont[40] [h] and Étienne.[7] [i]

5. Pseudo-membranous angina.[k]

6. Diseases of the Eye.[l]

This patient was treated in the service of Dr. W. S. Halsted, to whose liberality I owe the opportunity of reporting the case. To the kindness of Dr. C. G. Guthrie, I am indebted for the bacteriological examinations made.

BIBLIOGRAPHY.

1. Friedländer: Fortschr. d. Med., 1883, XXII, 715.
2. Landsteiner: Wien. klin. Wchnschr., 1897, X, 439.
3. Wilde: Inaug. Dissert., Bonn., 1896. (Orig. Ref. Centralbl. f. Bakteriol., 1896, XX, 681.)
4. Strong: J. Bost. Soc. M. Sc., 1899, III, 185.
5. Grimbert and Legros: Ann. d. l' Inst. Pasteur., 1900, XIV, 479.
6. Denys and Martin: La Cellule, 1893, IX, 268.
7. Étienne: Arch. d. méd. expér., 1895, VII, 124.
8. Hébert: Paris thesis, 1896.
9. Léon: Paris thesis, 1897.
10. Curry: J. Exper. M., 1899, IV, 169.
11. Fortineau: Compt. rend. Soc. de biol., 1904, LVII, 376.
12. Schlagenhaufer: Centr. f. Bacteriol., 1903, XXXI, 73.
13. Sachs: Wien. klin. Wchnschr., 1901, XIV, 999.
14. Schenk: Beitr. z. Geburtsh. u. Gynäk., 1898-99, I. Ref. Centralbl. f. Bakteriol., 1900, XXVII, 273.
15. Josserand and Bonnet: Arch. de méd. expér., 1900, XII, 5
16. Halban: Wien. klin. Wchnschr., 1896, IX, 1002.
17. Montt-Saavedro: Centralbl. f. Bakteriol., 1896, XX, 171.
18. Kiesentzki: Ges. pract. Aertze zu Riza, March 7, 1901. (Ref. Baumgarten's Jahresb., 1902, XVIII, 544.)
19. Howard: Phila. M. J., 1898, I, 336.
20. Russell: Brit. J. Dermat., 1892, IV, 105. (Ref. Centralbl. f. Bakteriol., 1894, XV, 324.)
21. Blumer and Laird: Johns Hopkins Hosp. Bull., 1901, XII, 45.
22. von Dungern: Centralbl. f. Bakteriol., 1893, XIV, 541.
23. Hlava: Baumgarten's Jahresb., 1893, IX, 320.
24. Christian: Med. and Surg. Rep., Bost. City Hosp., 1901, XII, 135.
25. Warburg: München. med. Wchnschr., 1899, XLVI, 955.
26. Ranzi: Wien. klin. Wchnschr., 1901, XIV, 801.
27. Macaigne and Vauverts: Ann. d. mal. d. org. génito-urin., 1896, XIV, 673.
28. Fricke: Ztschr. f. Hyg. u. Infectionskrankh., 1896, XXIII, 380.
29. Curry: J. Bost. Soc. M. Sc., 1898, II, 137.
30. Howard: J. Exper. M., 1900-1901, V, 139.
31. Flexner: Phila. M. J., 1898, II, 1019.
32. Breinl: Prager med. Wchnschr., 1904, XXIX, 354. (Ref. Baumgarten's Jahresb., 1904, XX, 701.)
33. Fraenkel: Wien. klin. Wchnschr., 1891, IV, 241, 265, 285.
34. Howard: J. Exper. M., 1899, IV, 149.
35. Neumann: Archiv f. Kinderheilk., 1891-2, XIII, 211.
36. Canon: Deutsche med. Wchnschr., 1893, XIX, 1038.
37. Wicklein: Centralbl. f. Bakteriol., 1895, XVIII, 425.
38. Kockel: Fortschr. d. Med., 1891, IX, 331.
39. Wright and Mallory: Ztschr. f. Hyg. u. Infectionskrankh., 1895, XX, 220.
40. Clairmont: Wien. klin. Wchnschr., 1899, XII, 1068.
41. Perles: Virchow's Archiv, 1895, CXL, 209.
42. Gourfein: Ref. in Baumgarten's Jahresb., 1902, XVIII, 548.
43. Dieulafoy: La Semaine médicale, 1900, 375.

---

[a] In these four the organism was found post mortem.

[b] Organism found during life.

[c] Bacteriological report deficient.

[d] Septicaemia starting from abscesses of gall-tracts.

[e] Organism reported as bacillus of Pfeiffer.

[f] Multiple infected liver cysts.

[g] Liver abscess following appendicitis and thrombosis of portal vein. Bronchopneumonia.

[h] Peri-cholecystitic abscesses and acute cholangitis.

[i] Mentions unpublished case of Neller (angiocholitis).

[k] Paris Thesis of Hébert[8]

[l] Perles[41] has demonstrated the marked pathogenicity of the bacillus of Friedländer for the eye. Kiesentzki[18] has reported a case of double purulent conjunctivitis in the new-born due to this organism; and Gourfein,[42] in an experimental research on the rôle of Friedländer's bacillus in ophthalmology found the organism in five per cent of four hundred and fifty cases of conjunctivitis, and in ten per cent of forty cases of dacryocystitis.

SEPARATE MONOGRAPHS REPRINTED FROM THE JOHNS HOPKINS HOSPITAL REPORTS.

Studies in Dermatology. By T. C. GILCHRIST, M. D., and EMMET RIXFORD, M. D. 1 volume of 164 pages and 41 full-page plates. Price, bound in paper, $3.00.

The Malarial Fevers of Baltimore. By W. S. THAYER, M. D., and J. HEWETSON, M. D. And A Study of some Fatal Cases of Malaria. By LEWELLYS F. BARKER, M. B. 1 volume of 280 pages. Price, bound in paper, $2.75.

Pathology of Toxalbumin Intoxications. By SIMON FLEXNER, M. D. 1 volume of 150 pages with 4 full-page lithographs. Price, in paper, $2.00.

Pneumothorax. A Historical, Clinical, and Experimental Study. By CHARLES P. EMERSON, M. D. Price, in paper, $4.00.

Operations of 459 Cases of Hernia, in the Johns Hopkins Hospital, from June, 1889, to January, 1899. By JOS. C. BLOODGOOD, M. D. Price, in paper, $3.00.

Orders should be addressed to

The Johns Hopkins Press, Baltimore, Md.

SUBMUCOUS RESECTION OF THE NASAL SEPTUM, TECHNIQUE AND RESULTS IN THE WRITER'S PRACTICE.*

By SYLVAN ROSENHEIM, M. D., Baltimore.

The development of this operation rests on principles praciced long before the operation attained any great vogue. Various orthopedic methods had been used to correct these iasal deformities. Many surgeons, among them Trendelenourg, Roux, Juracz and others attempted corrections, using he submucous method. For instance, Trendelenburg sepaated the movable septum from the upper lip, dissected up the nucosa, and then resected a small piece of cartilage. Among hinologists Hartman submucously removed in the early lays a small piece of cartilage. Peterson did the same makng a flap with the base upwards.

To Krieg, however, belongs the credit of putting the operaion on a sound basis. His first publication appeared in .886. His second report in 1889 records 14 cases and imrovements in technique. In his third report in 1900 he ;ives the results of 130 operations and refers to the nonecognition of his work. Krieg's operation consisted in a emoval of the deflected cartilage and bone with the sacrifice f the muco-perichondrium and periosteum of one side. He onsidered the operation at all times very difficult, at times a eritable "Kunststück." The after treatment took a number f weeks; but the results were excellent and in 50 per cent f the cases, external deformities were corrected. There vere perforations of the septum in 12 per cent of his cases. n 30 per cent of the cases a preliminary treatment, usually auterization of the inferior turbinate, rarely resection, was ıecessary.

Until 1899 the method had not been extensively used as is videnced by Victor Lange's statement in Heymann's Handuch that there was no good operative method for the correcon of septal deformities. In this year Bönninghaus reported 9 cases and stated that he had been using this method for ıe last four years. He lays emphasis on the importance and ecessity of also removing the bony parts of the deviation. he discovery of the properties of an aqueous extract of the prarenal capsule on the vascular system by Schaefer and liver and others and further work along this line by Abel as quickly followed by the clinical use of this substance. his discovery materially aided the development of this eration as it did of all other operative nasal work.

In America, Otto T. Freer developed this operation along iginal lines. His first publication in the Journal of the nerican Medical Association gives E. F. Ingals (1882) edit for originating the type of operation designated by ieg as the window resection. Freer's work was started in 01 and he was ignorant of the previous work of Krieg and nninghaus. Freer's original method consisted in the mak of flaps, the anterior one being held forward so as to roughly expose the deviation, and after dissection of the mucosa, in removing the cartilage. He then fractured the cartilage and placed it in a straightened position. In his later publications he states that he has given up the practice of fracturing the bony septum, and instead cuts it away with Grünwald's forceps. For this work he has devised 12 knives which are found to be most useful and necessary. In speaking of making the flaps he speaks of dissecting the mucosa but he probably includes the perichondrium and periosteum in this flap. Comparing this operation with the Asch method, he says "the latter will always be resorted to by the general surgeon who enters special fields without special skill, for the surgeon sins against us far more than the cautious general practitioner anxious for his patient's welfare."

Killian in 1904 published his most exhaustive paper giving the whole detail of the operation in his hands and the results of his cases. His paper marks an important milestone in the development of the operation, inasmuch as most operators at the present time use essentially his method. In a previous paper (1899) he had pointed out that the making of a flap and the use of his long speculum for "rhinoscopia media" materially helped in the operation and lessened the after treatment. He lays great stress in a strict aseptic technique and draws attention to the various contra-indications to the operation. Killian makes a vertical incision about one-half a centimeter behind the movable septum. This incision goes to the cartilage. He next elevates, laying stress on the importance of including the perichondrium in the part elevated. He next perforates the cartilage, using a finger in the other side of the nose to prevent going all the way through to the other side. After elevating the muco-perichondrium of the other side he removes the cartilage with his own cartilage knife or with Hartman's biting forceps. A picture of his cartilage knife readily demonstrates that Ballenger's swivel knife is practically the same with the exception that the knife revolves. Posteriorly the bone is removed with Hartman's biting forceps, anteriorly with Killian's chisel. If necessary the flap is sutured.

About the same time Hajek, Menzel and others published the results of their work and their methods, but they added nothing to that of Killian, in fact they hardly seemed to realize the beauty and the superiority of his work.

From this time on these methods of operating on deformed nasal septa increased in popularity. They were rather late in getting to England notwithstanding its proximity to the country where it originated and was rather extensively used. For instance, in 1901 Mayo Collier remarked that he had seldom or never attempted to straighten the septum; the results were most unsatisfactory, and he preferred to remove a piece with knife, chisel or saw. In 1904, St. Clair Thomson described his results in a number of cases.

There have been various improvements in technique in the

Paper read before The Southern Section of the American yngological, Rhinological and Otological Society, Jan. 21, 1911.

last few years. Ballenger's swivel knife, a modification of Killian's cartilage knife, has simplified the removal of the cartilaginous septum. Hurd, Beck, Carter, Bruning and others have devised various instruments that assist in the operation. To prevent perforations, Gulliver transplants a piece of muco-perichondrium from the redundant side in the perforated spot and holds it there with packs. Ballenger describes another method of avoiding a permanent perforation, which he says he learned from Dr. Goldsmith of Toronto. After resecting the cartilage it is placed in normal salt solution and if there is a perforation produced during the operation, a piece of this cartilage is placed and held there by packs. Yankauer's suggestion to extend the vertical incision across the base of the nose, aids considerably in enlarging the field of operation.

WRITER'S METHOD OF SUBMUCOUS RESECTION OF THE DEVIATED NASAL SEPTUM.

The patient enters the hospital on the morning of the operation, undergoing a thorough physical examination. The urine is examined for albumin and sugar. One-half hour before the operation there is administered a hypodermic of one-quarter grain of morphia.

Instruments.—The following instruments are used: Beckman's nasal speculum, probe, applicators, Freer's right and left angular and straight knives, Freer's sharp and dull elevator, Jansen's dull elevator, the writer's specula, Ballenger's swivel knife, Grünwald's and Jansen's biting forceps, Killian's chisel and hammer, dressing forceps, and Worthington's membrane holder.

Technique.—Two nurses are used, and the instruments are sterilized by boiling, the head mirror by the use of formalin vapor. [Photographs show the arrangement of the room and table.] The patient's face is washed with soap and water, alcohol, and bichloride solution. A sterile towel is placed around the head and a sterile sheet covers the body.

Operation.—The septum is cocainized with swabs placed first in adrenalin chloride solution 1-1000, wrung dry and then dipped in powdered cocaine. This is rubbed on both sides and also on the turbinates if these are to be removed at the same time, and in the antral, ethmoid and sphenoid regions, if a sinus operation is also to be performed. Cocainization is very rapid and the writer has not seen a single case of cocaine intoxication by this method in over five years' use of cocaine, whereas such was not infrequent by the pledget method of using cocaine. Also the anesthesia is much more profound especially where sinus work has also to be done. Rarely general anesthesia is necessary, ether being used. After cocainization, long pledgets soaked in a 1-1000 solution of adrenalin and wrung out almost dry, are packed against the septum of both sides and allowed to remain there from five to ten minutes.

The initial incision of Killian is made just in front of the deflected portion and continued outwards across the floor of the nose as suggested by Yankauer. This incision goes down to the cartilage and the muco-perichondrium and muco-periosteum of the convex side is then elevated with the various elevators described. The cartilage is next incised to the perichondrium of the opposite concave side. One soon learns to recognize when the perichondrium is reached and no special instrument or technique is necessary to prevent perforation at this point. If it occurs the method described by Ballenger of inserting a portion of the resected cartilage here can be used, although the author has had no occasion to try this procedure. Next the muco-perichondrium and muco-periosteum of the concave side are elevated. This is often much accelerated and rendered easier by the employment of the author's speculum which is next inserted, one blade on each side of the cartilage, and then opened up as far as possible. By the use of his speculum the field of the following steps is made most plain and visible and any injury of the membrane of either side is prevented (see cuts). The cartilage and bony deflected parts are then removed with Ballenger's swivel knife, Grünwald's and Jansen's biting forceps. The maxillary crest is removed with Killian's chisel. Where the deflection is very acute this method is slightly modified in that the cartilage up to the point of the deflection is first removed, and then the remaining part can be manipulated into a better position for continuing the dissection of the membranes. After all the deflected parts of cartilage and bone are removed the wound is thoroughly cleaned of debris with cotton sponges soaked in normal salt solution. The membranes are then smoothed down after removal of the speculum and the septum examined to find if straight or not. If it is not straight, it is due to insufficient removal of cartilage, bone or bony crest of the superior maxilla, which is removed until the septum assumes a vertical position. The membranes are held in position by Worthington's holder and a pack placed in each nostril, when the membrane holder is withdrawn. These packs are made of strips of iodoform gauze, surrounded with gutta percha protective and are greased with vaseline before insertion into the nose. A number of various degrees of thickness are made for each case and one that fits into the nares snugly is used on each side. They make most excellent packs, are withdrawn without any pain to the patient and without that bleeding which is so annoying after withdrawal of the ordinary gauze dressing. In case sinus work has been done, the protective covering of the pack is perforated in a number of places. If the ethmoid cells have been opened also, a small perforated pack is placed in this region superimposed on the other pack.

After his return to bed, the patient is given a glass of water containing thirty grains of urotropin to the quart, every hour. He is put on full diet. If there is any headache he is given either migraine tablets, or a powder of acetanilid five grains, codeia sulphate half a grain, and one grain of caffeine citrate. If these are not efficient he is given a hypodermic of one-quarter grain of morphia. The next morning he is given a bottle of citrate of magnesia. The pack on the side opposite the incision is removed at the expiration of 24 hours, and on the side of the operation at the expiration of 48 hours. He is discharged from the hospital on the second day and after the packs are withdrawn is given a spray of Dobell's solution with a 1-10,000 or 1-15,000 solu-ion for home use. Usually but little after treatment is re-uired in the simple cases. Where an inferior turbinectomy r a sinus operation is performed at the same time, it is neces-ary to irrigate the nose for some time afterwards.

WRITER'S RESULTS.

The object of this paper is to give the results up to date n a series of cases in which he has performed this operation. His conclusions are based on his records of over fifty cases. Some earlier cases were dispensary cases of which he has no histories. Some of this small series were also dispensary cases but inasmuch as these received the same attention as the private cases, they are of equal value as statistics. Letters were written to all of the patients to return for examination o determine whether there had been any difference in the esult as considered for a short time after the operation. Unfortunately only a small percentage have seen fit to appear twenty-three). Letters have been received from seven which re of some value.

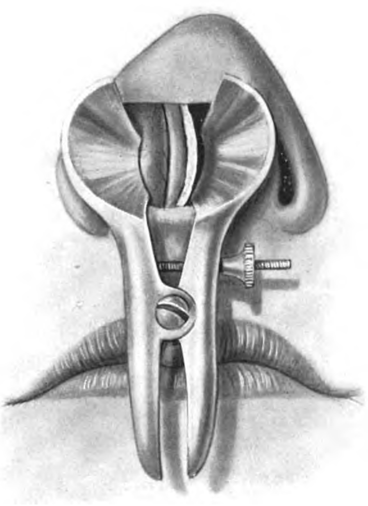


FIG. 1.—**Speculum in place, before removal of cartilage and bone.**

I shall first enumerate the results in these cases at the ime of their discharge and then give the further observa-ons based on those patients who have returned for examina-on or who have written.

Regarding the ages of these patients, all but four of the rly cases are over fifteen years of age. One patient was n, another twelve, and two were thirteen years old. Owing the fact that we do not know what effect this operation ill have on the development of the nose, I have thought best not to operate on young children unless the breathing absolutely cut off. In such cases it might be well to endeavor to improve the septal position by widening the palatal arch as suggested by Black, Brown, and others. So far I have seen but one of these young patients after the lapse of any time. This patient was a boy aged 13 years, on whom a submucous resection of the septum and later a double inferior turbinectomy was performed. Now, over three years later, the good result obtained at the time of the operation still continues; the breathing space is good, and the nose, he thinks, has rather improved in shape.

In about half of my cases a simple submucous resection was performed and in nearly all the rest either the inferior turbinate of one or both sides was removed in part. In one case, the anterior ends of the middle turbinates were resected. In three cases extensive sinus work was performed at the same time. In one case a hump on the dorsum of the nose was also removed by an external incision.

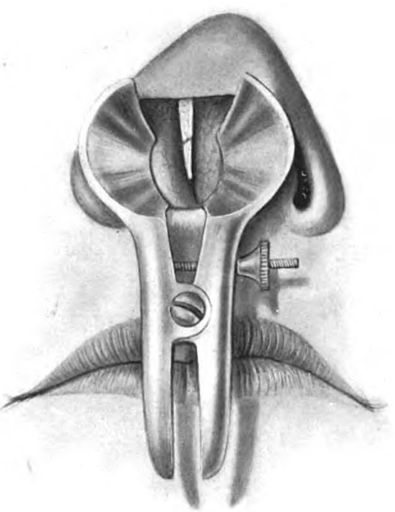


FIG. 2.—**Deflected bone and cartilage removed. Posterior part of vomer and perpendicular plate of ethmoid visible.**

Reaction Following Operation. Infection.—I had always considered the submucous resection of the septum, an operation with no risk of mortality until I received a report from H. Hays, in which he described two cases of infection, resulting in one case in meningitis and death. Purcell also mentions one death following infection. As practically all these cases were done in the hospital the temperature charts have been at my disposal for accurate observation; also I have seen all of the cases for long enough times after the operation to make my following remarks absolutely accurate.

The temperature charts of my cases, to all but a few of which I have had access, show in most either a normal temperature or a rise of about one degree on the following day which quickly subsides after removal of the packs and clearing of the bowels. In one case the rectal temperature rose to 102.5° F. and in another 103.4° F. but in these cases the temperature subsided in about 24 hours to normal after removal of the packs and calomel purgation. I have two cases of slight infection to report. In one case, an incomplete submucous resection was done by one of the house surgeons—his first case. Four days later the patient was readmitted to the hospital with a red swelling on the side of the nose which proved to be erysipelas, a mild attack, which quickly subsided. Examination of the nose revealed an incomplete removal of the cartilage and a small perforation of the septum and the septum somewhat swollen. One month later a more complete submucous resection was performed with excellent result. The day following the operation, the temperature went up to 102.6° F. (rectal) but fell to normal in 24 hours. In another case there was a slight infection between the membranes with slight swelling and slight elevation of temperature. A small amount of grumous material was scraped out through the original incision and a counter incision made in the septum, a little posteriorly. This discharged pus for about a week and then closed, leaving a clean septum, with no perforation. This case has been attended by no other bad result—such as sinking of the bridge of the nose.

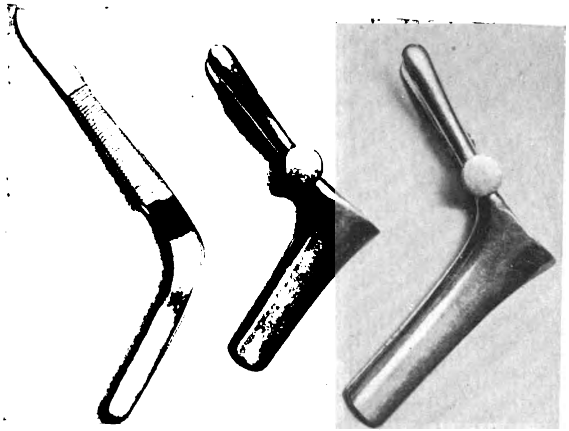


FIG. 3.—Worthington's flap holder, and author's speculum (two sizes).

Results in General.—In general, the results may be termed excellent. The main cause for this operation, difficulty in breathing through the nose, has been relieved in all cases but one, and in that case failure was due to a projection of the end of the quadrangular cartilage outside the nose on the side opposite the side of the deflection. This was not removed at the operation and on removal of the packs the cartilage reassumed a deflected position. Unfortunately this was an out of town patient and I have had no further opportunity to correct the work. The lesson from such a case is to operate from both sides, dissecting out the anteriorly placed deflection through an incision made in the cutaneous septum. Although no particular attempt was made in any of the cases to remedy external deformities, these were in many cases much improved as is shown by the rough casts of one case. These plaster casts are not difficult to make and once made, constitute an excellent method of gauging the result in this particular. In one case headaches were entirely relieved. A severe neuralgia of the side of the face to which the septum was deviated has been entirely relieved for three and a half years following the operation in another case. A general improvement in health was noted by many.

Perforation of the Septum.—I have notes of perforations in four cases; three of which were very small and one being fairly large. In the last case, done some years ago, the deviation, as shown by the plaster cast, was very extreme, forcing outward the nasal bone of that side. I take it, however, that a perforation in this case could either have been avoided or would have been much smaller by using the method described earlier, namely, first removing the cartilage up to the point of deflection before attempting to dissect the membranes beyond this point. As has been the experience of others, I have observed no scabbing about these perforations nor have they given a patient, who is unaware of them, any discomfort.

Special Results.—One of the objects in reviewing these cases was to determine whether there occurred after the lapse of some time any bad after effects, such as sinking of the bridge of the nose. I also wished to get some evidence regarding the reformation of the cartilage and bone removed.

Depression of the Bridge of the Nose.—An early report by Sheedy of a number of cases of a sinking in of the nose following this operation made me particularly apprehensive in this regard. A later report by him is to the effect that now he seldom sees this deformity and thinks the former bad results were due to too extensive removal of cartilage. As the immediate result of the operation, I have not seen such a result. I have seen or heard from twenty-nine patients on whom I have operated from over four years ago to the present time. In not a single case was there a trace of any secondary sinking of the bridge of the nose. Several of these patients had syphilis which had been thoroughly treated and they did as well as any of the cases.

Reformation of the Septal Cartilage and Bone.—At the present time I can report on but eighteen cases in regard to this point. In all, the septum had regained firmness but in none could one say that there was complete reformation of the cartilage and bone. In some there was a large area, quite soft and movable to the probe; in others this area corresponded only to the center of the place from which the cartilage had been removed. Some of the more recent cases were firmer than the earlier cases. It is possible that this is due to not having included all of the perichondrium and periosteum in the early cases.

CONCLUSIONS.

1. The submucous resection of the nasal septum is a method by which all varieties of deflections of the septum can be corrected.

2. It is probably better for us to be cautious in the case of young children and do the operation only when it is urgently demanded.

[redacted] is often a necessary accompaniment in order to complete the sinus work and obtain free drainage. Such operations as well as inferior or middle turbinectomies are best done at the same time.

4. Luetic individuals who have been well treated and show no signs of the disease, yield as satisfactory results as others.

5. It is absolutely essential to have strict asepsis in all the details of the work.

6. Infections following this procedure should be as infrequent as in any other operation carried out with aseptic technique, and the operation considered both safe and satisfactory.

7. Perforations of the septum may be caused infrequently but they are of no consequence and cause the patient no discomfort.

8. There is no reason to fear sinking of the bridge of the nose, following at any time after the operation. On the other hand, external deformities which may be present are frequently relieved.

9. While it is possible that there may be, to a slight extent, new cartilage or bone formed after the operation, this is never complete.

BIBLIOGRAPHY.

Abel, John J.: On the Blood-Pressure-Raising Constituent of the Suprarenal Capsule. Johns Hopkins Hosp. Bull., July, 1897.

Abel, John J.: On Epinephrin and Its Compounds, etc. Am. J. Pharmacy, July, 1903.

Black, W. M.: Septal Deviations. J. Am. M. Ass., March, 1909.

Ballenger, W. L.: A New Technique for the Submucous Resection of the Cartilaginous Septum. The Laryngoscope, June, 1905.

Ballenger, W. L.: The Submucous Resection of the Septum, Illustrated. The Laryngoscope, 1907.

Barnhill, J. F.: J. Laryngol., July, 1906.

Beck, J. C.: J. Laryngol., 1906.

Bönninghaus, George: Ueber die Beseitigung schwerer Verbiegungen der knorpeligen und knochernen Nasenscheidewand durch die Resection. Arch. f. Laryngol. u. Rhinol., 1899, IX.

Brunings: A Contribution to the Submucous Resection of the Nasal Septum. J. Laryngol., 1908.

Collier, Mayo: Remarks at Meeting of the British Laryngological, Rhinological and Otological Association, March, 1901. J. Laryngol., 1901.

Carter, W. W.: Instruments for the Submucous Resection of the Septum. The Laryngoscope, April, 1906.

Carter, W. W.: Report of Cases of Submucous Resection of the Septum, with Conclusions Drawn from Same. The Laryngoscope, 1906.

Douglas, B.: Nose and Throat Surgery, 1906.

Emerson, Francis P.: The Results of the Operation of Submucous Resection of the Septum in Private Practice. J. Am. M. Ass., Oct., 1910, 1449.

Fein, J.: A Note on a Simple Method of Performing Submucous Resection of the Nasal Septum. J. Laryngol., 1909. Original article in Monatschr. f. Ohrenh., No. 8, 43.

Fein, J.: The Simple Window Resection. J. Laryngol., 1910. Abstract.

Freer, Otto T.: The Correction of Deflections of the Nasal Septum, with a Minimum of Traumatism. J. Am. M. Ass., Dec. 5, 1903.

gänzender Nachtrag. Arch. f. Laryngol. u. Rhinol., XX, 361.

Glas, Emil: On the Indications and Operation for Deflection of the Nasal Septum. J. Laryngol., 1910. Abstract.

Gulliver, F. D.: A New Method for the Repair of Perforations Occuring during the Submucous Resection of the Nasal Septum. Lancet, 1909, 166.

Hajek, M.: Bemerkungen zu der Kriegsche Fensterresektion. Arch. f. Laryng. u. Rhinol., 1904, XV, 44.

Hilscher, F. W.: Submucous Resection of Septum. Northwest Med., Nov., 1909.

Hays, H.: Septicæmia following Submucous Resection of the Nasal Septum. The Laryngoscope, 1909.

Hurd, L. M.: Elevator, Speculum and Forceps for Use in the Submucous Resection of the Nasal Septum. The Laryngoscope, 1905.

Killian, Gustav: Die submücose Fensterresektion der Nasenscheidewand. Arch. f. Laryng. u. Rhinol., 1904, XVI, 362.

Klemptner, L.: Die submukösen Resektion der Nasenscheidewand. Arch. f. Laryng. u. Rhinol., 1910, XXIII, 412.

Krieg: Ueber die Fensterresektion des Septums nariums zur Heilung der Skoliosis Septi. Arch. f. Laryng. u. Rhinol., 1900, X, 477.

Laurens, G.: Chirurgie du Nez.

Levy, R.: Indications for the Submucous Resection of the Nasal Septum. The Laryngoscope, 1906, 200.

Lothrop, O. A.: Some Observations on the Late Results obtained by the Submucous Resection of the Nasal Septum. J. Laryngol., 1901. Abstract.

McCaw, J. F.: The Submucous Resection of the Nasal Septum with Ballenger's Swivel Knife. The Laryngoscope, 1906.

McCoy, John: Forceps and Knife for Use in the Submucous Septal Operation. The Laryngoscope, 1906.

Menzel, K. M.: Zur Fensterresektion der verkrummten Nasenscheidewand. Arch. f. Laryng. u. Rhin., 1904, XV, 48.

Richardson, C. W.: The Operative Treatment of Deflections of the Nasal Septum. J. Laryngol., 1909. Abstract.

Sheedy, B. de Forrest: Deviations and Deformities of the Nasal Septum, with Special Reference to Possible Results Following the Submucous Operation. Internat. J. Surg., Dec., 1907.

Sheedy, B. de Forrest: The Saw and Crushing Instruments in Surgery of the Nasal Septum. Med. Rec., Oct., 1910.

Thomson, St. Clair: J. Laryngol., 1904.

Suckstorff: Zur Geschichte der submucösen Fensterresektion der Nasenscheidewand. Arch. f. Laryng. u. Rhinol., 1904, XVI, 355.

Tilley, L.: J. Laryng., 1907.

Yankauer, S.: The Incision for the Submucous Resection. Ann. Otol., Rhinol. and Laryngol., XVIII, 833.

THE JOHNS HOPKINS HOSPITAL REPORTS.

Vol. XV (1910), 542 pages and 87 illustrations. It contains:

Bacteriological and Clinical Study of Diarrhœa in Children by Drs. J. H. M. Knox, Jr., and Edward H. Schorer.

Studies in Pneumonia by Drs. J. A. Chatard, M. Fabyan, C. P. Emerson, H. T. Marshall, Thos. V. McCrae, W. R. Steiner, C. P. Howard and F. M. Hanes.

Skin Transplantation by Dr. J. S. Davis.

Epidemic Cerebro-Spinal Meningitis and Serum Therapy by Dr. F. J. Sladen.

Price, in Cloth, $5.50. Paper, $5.00

Orders and remittances should be addressed to

The Johns Hopkins Press, Baltimore, Md.

THE GROWTH OF EMBRYONIC CHICK TISSUES IN ARTIFICIAL MEDIA, AGAR AND BOUILLON.

By Margaret Reed Lewis

and

Warren H. Lewis, M. D.

(From the Anatomical Laboratory, The Johns Hopkins University.)

In 1908, working under Dr. Max Hartman at the Kgl. Institut für Infectionskrankheiten in Berlin, one of us found that bone-marrow from the guinea-pig formed a membrane-like growth with mitotic figures on the surface of nutrient agar. This agar was a modification of one used at the Institute for the cultivation of amœba. In the place of distilled water a modification of Locke's modification of Ringer's solution was substituted.

Last fall we began the cultivation of embryonic pig bone-marrow in the blood plasma of older pig embryos. We utilized very much the same methods as were described by Burrows and Carrel, but without very conclusive results. We attempted to start our cultures from a very few cells instead of small pieces of tissue.

With the appearance of the important publications by Burrows and Carrel on the cultivation of the tissues of warm-blooded animals in clotted plasma adopted by Burrows from Harrison's brilliant discoveries on the growth of amphibian tissues, especially nerve axons in clotted lymph, we began similar studies on embryo chicks of various ages and were able to obtain by the method of Burrows and Carrel very wonderful growths from the various organs of the embryo.

The blood of adult chickens was used. It was taken from the external jugular vein, which lies just beneath the skin of the neck by means of a glass canula coated with paraffin, instead of oil, and was allowed to flow into paraffin-lined tubes, cooled in a freezing mixture, centrifugalized, the plasma drawn off and kept in paraffin-lined tubes in the ice box. We have obtained excellent growths with plasma two weeks old. Instead of sealing the hanging drops with paraffin, we find vaseline, which has been in the autoclave more satisfactory.

Not only were growths obtained in hanging drops, but much more extensive ones were obtained in Petri dishes, the diameter of these growths sometimes exceeding 1 centimeter. The Petri dishes must be kept in a moist chamber to prevent drying. The Petri dish method affords certain advantages for experimentation on the growth, which can be subjected to the influence of various fluids for varying lengths of time. We have obtained beautiful results with some of the vital stains, especially neutral red.

We have not found it necessary to dissect the chicks in a warm chamber, provided one works with sufficient rapidity in transplanting. Our observations have been made with the use of the warm stage, which seems quite satisfactory. Good growth takes place at temperatures varying from 34°-42° C.

There is great similarity in the growths from pieces of liver, intestine, heart, brain, kidney, adrenal, muscle, stomach, thyroid, retina, cornea, etc., of chick embryos from 10 to [illegible] days old. Radiating strands, migrating cells, membrane formations and vesicles or loop-like places seem to be common to all. The spleen, however, usually sends off migrating cells alone for some time after the culture is made, and only later do the radiating cells appear, if they appear at all.

The general similarity in the growths from the various organs seems to lead to the conclusion that the growing tissues are only such as are common to the various organs, namely, connective tissues of various kinds and endothelium of the blood vessels. We have been able to trace, in some fixed and stained specimens, the endothelium from the blood-vessels of the original piece out into the new growth where the cells of the endothelial radiations closely resemble the cells of the other radiations found there.

Recently we have succeeded in cultivating small pieces of embryonic chicks in a nutrient agar both in hanging drops and Petri dishes. The growths have, as a rule, not been so extensive as those in the plasma, but otherwise resemble them. Some specimens show radiations, others membranes and reticular formations with migration of cells. Mitotic figures are found in the stained preparations. The cells often show long irregular processes and move outward from the old piece. The following medium has so far given the best result with chick tissue:

Ringer			
NaCl	.9	gm.	
KCl	.042	"	
$CaCl_2$	.025	"	10 cc.
$NaHCO_3$	.02	"	
H_2O	100	cc.	
Agar	.25	gm.	
Bouillon			2 cc.
NaCl			.0675 gm.

Into a hanging drop of this medium we transplanted two small pieces from the liver of a nine-day chick embryo. Within 24 hours cells began to radiate and migrate from the smaller piece into the surrounding medium. In 48 hours the growth had exceeded that of the control in plasma and was as extensive as any growth observed in plasma from such a small piece, less than ½ mm. in diameter. The entire growth at the end of 48 hours was four times the diameter of the original piece and could readily be seen with the unaided eye.

The specimen was fixed when 48 hours old in osmic acid vapor and stained with Ehrlich's hematoxylin and eosin. All stages of mitosis are present in the new growth; as many as 10 mitotic figures were counted in one field under the high power.

[redacted]ryo, continued in regular peristalsis or over 48 hours in the nutrient agar.

We have obtained growth in the nutrient agar containing rom .9% to 1.58% of NaCl, 10% and 20% bouillon with .25% nd .5% agar.

More recently still we have obtained active growth and mi-ration of cells in a fluid medium as follows:

Ringer
NaCl .9 gm.
KCl .042 "
CaCl$_2$ .025 "
NaHCO$_3$ .02 "
H$_2$O 100 cc. .... 5 cc.
Bouillon .... 5 cc.
NaCl .... .045 gm.

The migrating cells in this fluid medium are often irregular ith long slender processes almost exactly like those we have en in plasma media. The cells are active, sending out and tracting their pseudopodia, and sometimes moving slowly pparently on the under side of the coverslip. Some of the ansplanted pieces also show radiations.

Shorey reports the growth of nerve fibers of Necturus in a nutrient gelatin, but no notice of an active proliferation or migration of cells was contained in her description.

REFERENCES.

Burrows, M. T.: The cultivation of tissues of the chick embryo outside the body. Jour. Am. Med. Ass., Dec. 10, 1910, pp. 2057-2058.

—— The growth of tissues of the chick embryo outside the animal body with special reference to the nervous system. Jour. Exp. Zool., Jan. 1911, vol. 10.

Burrows, M. T. and Carrel, A.: The cultivation of adult tissues and organs outside the body. Jour. Am. Med. Ass., Oct. 15, 1910, pp. 1379-1381.

Carrel, A. and Burrows, M. T.: Cultivation of tissues in vitro and its technique. Jour. Exp. Med., vol. 13, 1911.

Harrison, R. G.: Observations on living, developing nerve fibres. Proc. of the Soc. for Exp. Biol. and Med., vol. 4, pp. 140-143, 1907.

—— The outgrowth of the nerve fibre as a mode of protoplasmic movement. Jour. Exp. Zool., vol. 9, 1910.

Shorey, Marian L.: A study of the differentiation of neuroblasts in artificial culture media. Jour. Exp. Zool., 1911, vol. 10.

PROCEEDINGS OF SOCIETIES.

THE JOHNS HOPKINS MEDICAL SOCIETY.

Meeting of October 17, 1910.

Dr. Louis Hamman presiding.

mployment of Radium as an Aid to Surgery in the Treatment of Cancer, Angioma and Keloid.* Dr. Louis Wickham, Paris, France.

The destruction by burning, which is chiefly sought for many radium-therapeutists, is not of great interest, since milar results can be obtained by many other agents.

The most interesting and important aspect of radium as a erapeutic agent is the selective action of the rays. Here dium plays the rôle of a subtle modifying agent, which es to seek out those elements which are the most sentitive its action. All morbid conditions are not suitable ground this selective power; the most favorable are cancer, an-ma, keloids, eczema, and other diseases.

The exact meaning of "selective action" is that a certain antity of measured radio-activity can modify the cancerous ls and arrest their malignant evolution, without producing modifying action on the normal cells surrounding the cer, thus enabling a cancer to regress and disappear with- producing on the surface any signs of irritation or in-mation.

This selective action can work either on the superficial or deep seated pathological tissues, the rays possessing the er of traversing them. The determining cause between caustic action which burns, destroys, and the selective on is the *quantity* of rays absorbed in a given time by the tissue. If large quantities of slightly penetrative rays be employed, the result is a superficial necrotic action; but if the quantity be measured, a selective action without any irritation can be secured.

If a large quantity of superpenetrative rays be used a deeper necrotic action follows, but let the quantity be measured, a selective action in the deep seated tissues without any irritation is the result.

Dr. Wickham here showed a series of lantern slides representing histological sections of fragments taken from a voluminous cancer of the breast (lobulated epithelioma) where the selective action of the rays was demonstrated. In this case this selective action was visible on fragments taken even from a depth of nine centimeters, a depth which, up to now, had not been deemed affectable by the radium rays.

The depth at which radium works depends on the quantity of radioactivity employed which in this case was 19 cgr. of pure radium applied for 48 hours at one point.

Dr. Wickham laid stress on the importance of acting simultaneously on, or in, several points of the tumor by his "cross-fire" method in order to concentrate the greatest possible quantity of rays on the points in the deep-seated tissues so that the rays may act with greater homogeneity.

He showed, by means of lantern slides, cases, treated in collaboration with Dr. Degrais, of grave cancer, angioma, and keloids, in which the regressions were very remarkable.

The methods for the treatment of cancer by radium, that he has established with Dr. Degrais, joined to other methods of using radium as a therapeutic agent have led Dr. Wickham to the following conclusions:

---

bstract of a paper read before the Johns Hopkins Hospital cal Society, October 17, 1910.

1st. The excellence of the results cannot exist without long experience and a profound knowledge of the methods to be used, and principally without a large quantity of radium.

2d. In the majority of cases surgery should be associated with the use of radium.

The radium-therapeutist, in the presence of a case of grave cancer, must first consult a surgeon in order that the patient may not be deprived of the prompt help of surgery.

If surgery is confronted with a case difficult or impossible to operate upon, radium can be applied *before hand,* in order to prepare the ground, or *afterwards* in combination with operative measures. Surgery ought to be utilized for making the perforations, incisions or partial extirpations which diminish the thickness of the tissues and render more effective the action of the radium introduced into the wounds.

Surgery should be also employed for opening a way for radium through artificial orifices or for conducting the tubes of radium to the tumors through the natural orifices. It is under such conditions that Dr. Wickham has treated cancers of the œsophagus, of the neck, of the bladder, of the intestines, of the rectum, of the larynx, of the uterus, subcutaneous and deep-seated cancers, cancers of the breast, etc. Dr. Wickham related the history of several cases of cancer which, normally would have succumbed in 2 or 3 months, but which are still, after one year, having their condition ameliorated. Surgery should develop its ingenuity for finding operative means of helping to apply the radium so that it will penetrate to the seat of the tumors, above all when these are of difficult access.

3d. The tumors should be inundated by the rays, and to this end the apparatus chosen should be the most powerful possible, and so numerous that the different radium containers may be employed in opposition, either on the exterior of the tumor, or in the interior after perforation. If there is any skin, mucous membrane, blood vessel, or nerve to protect, there must be placed between the apparatus and the tissues, metal screens (aluminum, lead) whose thickness varies in proportion to the amount of radioactivity needed, and the duration of the application. This is the method of filtration that Dr. Wickham inaugurated in 1905, which is very useful when strong action in the depth of the tumor is needed, to prevent injuring the surface. The apparatus can be employed with very thin filters when it is important to utilize the maximum quantity of rays.

4th. Like surgery, radium has neither an action on the general physical condition, nor can it prevent recurrences and metastases. This should be insisted upon in order that the term cure, which on principle should be avoided, may be attributed only to the regression of the tumor itself, and so that there may be no risk of deceiving either the patient or the family physician.

5th. Even thus limited radium is a valuable weapon. In our struggle against cancer we are so badly armed that any new therapeutic agent if it be in some way really effective, as it is in this case, should be taken into serious consideration. By the help that radium brings to those suffering from cancer, it occupies a high place in our esteem and is the principal reason of the gratitude we owe to the discovery and scientific works of savants like Curie, Ramsay and Rutherford.

NOTES ON NEW BOOKS.

Practical Bacteriology. Blood Work and Medical Parasitology, Including Bacteriological Keys, Zoological Tables, and Explanatory Clinical Notes. By E. R. Stitt, M. D., Surgeon U. S. Navy, etc. Second edition. Revised and enlarged. Illustrated. Price $1.50. (*Philadelphia: P. Blakiston's Son & Co., 1909.*)

To the first edition, reviewed in the Bulletin, December, 1909, the author has added a chapter on Poisonous Snakes, and here and throughout the volume has incorporated new material, so that his work is as much "up to date" as possible. Dr. Stitt has crowded too much into this book—and this is its drawback—but it has merits which make it a useful aid to the student, who is willing to use it as a guide only, along with other standard textbooks.

The Harvey Lectures. Delivered under the Auspices of The Harvey Society of New York, 1909-10. (*Philadelphia and London: J. B. Lippincott Company, 1910.*)

The lectures by Prof. Richard M. Pearce on "The Problems of Experimental Nephritis," and by Prof. Eugene L. Opie on "Inflammation" have already appeared in the Archives of Internal Medicine, and that by Prof. Magnus-Levy on "Uric Acid in Gout," in the American Journal of the Medical Sciences. The other papers by Professors Huber, Cohnheim, Brodie, Hektoen and Meyer are here published for the first time. Three of these lectures, those by Pearce, Brodie and Huber, deal with problems relating to the kidney; in last year's series there were four on metabolism in connection with which Magnus-Levy's paper should be read. He and Prof. Cohnheim, who discussed "The Influence of Sensory Impressions on Scientific Deductions" were the two notable foreigners who appeared before the society. Dr. Meyer dealt with the much involved problem of "The Present Status of Aphasia and Apraxia," and Dr. Hektoen also treated a very complex subject in his lecture entitled, "On the Formation and Fate of Antibodies.

The Harvey lecturers contribute annually much that is of permanent value to medical science, and the addresses of the past year emphasize the importance of this society.

Treatise on Diseases of the Skin. For the Use of Advanced Students and Practitioners. By Henry W. Stelwagon, M. D., etc. Sixth edition. Thoroughly revised. Illustrated price, $6.00. (*Philadelphia and London: W. B. Saunders Company, 1910.*)

Between June, 1902, and the present time this work has been reprinted ten times and revised six, which shows the exceptional but well deserved, success it has had. The last edition is more abundantly and still better illustrated than its predecessors, and the author has added much new text on pellagra, sporotrichosis, oriental sore, gangosa, granuloma annulare and other rare affections, thus keeping his book well up with the latest developments in knowledge and treatment of these diseases. The third edition was reviewed in the Bulletin in August, 1904. What most prac-that can be given them, for re are no diseases more trying than these to both doctor and ient, and none in which no help seems to be forthcoming at ies, but with the author's guidance doctors can at least feel tain they are doing no harm, and as much good as anyone, if y make the right diagnosis. That is the difficulty in these dis-es, but here also the author is clear in his descriptions, and the ipler affections should be easily recognized after studying his criptions of them. The rarer ones, when met with, should be erred to a specialist. The book is in every respect thoroughly able.

erican Edition of Nothnagel's Practice. Diseases of the Intestines and Peritoneum. By Dr. Hermann Nothnagel, of Vienna. Edited with additions by H. D. Rolleston, M. A., M. D., F. R. C. P., etc. Second edition. Thoroughly revised. Price, $5.00. (*Philadelphia and London: W. B. Saunders Company, 1907.*)

he excellencies of this work were noted in the Bulletin at the e of its first appearance (July-August, 1904), and this edition n improvement on the first. It has been "thoroughly revised" those already acquainted with Dr. Rolleston's work will be d to have a chance to see how his views on many points, still iting solution, have been modified, and note the changes has found it necessary to make. Students should be familiar h Nothnagel's Practice, which is a standard work.

gnosis and Treatment of Women. By Harry Sturgeon Crossen, M. D., Professor of Clinical Gynecology, Washington University, St. Louis, etc. Second edition. Revised and enlarged. Illustrated. (*St. Louis: C. V. Mosby Company, 1910.*)

he first edition of this work was reviewed in the Bulletin April, 1908. Since then the author has enlarged his book, improved his index, and now more than ever the general ctitioner will find the volume a most useful one.

ntific Memoirs. By Officers of the Medical and Sanitary Departments of the Government of India. (New Series) No. 38. *reliminary Report on the Killing of Rats and Rat Fleas by Hydrocyanic Acid Gas.* By Captain W. D. H. Stevenson, M. B., I. M. S. (Bombay Bacteriological Laboratory.) Price 9d. (*Calcutta: Superintendent Government Printing, India, 1910.*)

ie nature of this report is of such a special character that it not appeal to many readers, but our health officers and others ld read it, as all carefully studied means for exterminating ause of plague should receive serious attention by them.

e Annual Report from the Chemical Works of E. Merck of stadt (*Ger.*), which has just appeared, contains much in-ting information "of recent advances in pharmaceutical istry and therapeutics." Eighty-five pages are devoted to m Therapy and Bacteriotherapeutic Preparations," and 250 to new preparations and drugs. The therapeutist and aceutist, when desirous of information about the newest cal preparations, will find this report a useful and reliable

odern Treatment of Alcoholism and Drug Narcotism. By A. McBride, M. D., L. R. C. P. & S. (Edin). Price $2. *ew York: Rebman Company, 1910.*)

icians in charge of sanatoria for the care and cure of in-s, and others addicted to various drugs, will be glad to have lume on their shelves. The author has had a very large

tion. The book is brief, divided into six chapters as follows: 1, What is Inebriety; 2, Pathology; 3, The Causes of Inebriety; 4, The Forms of Inebriety; 5, Treatment; 6, Ether Inebriety, etc., and an Index. Perhaps the best chapter is the one on treatment and this is doubtless the one of most interest to the student of these troubles. The readers of this work should not be misled by the optimism of the author, which at times leads him, we feel, to exaggerations.

The Diseases of China, Including Formosa and Korea. By W. Hamilton Jefferys, M. D., Medical Missionary in China, etc., and James L. Maxwell, M. D., Medical Missionary in Formosa, etc. Illustrated. Price $6. (*Philadelphia: P. Blakiston's Son & Co., 1910.*)

A couple of sentences from the authors' preface set forth clearly the nature and scope of this interesting work. "It is necessary to emphasize that this book is not in any sense intended to be a general text-book of medicine, nor even to cover the whole ground of the diseases met with in China . . . . Our aim is to present to medical men working in China, both Chinese and foreigners, a concise account of the special diseases they will meet with in their own practice in this Empire." This is a really valuable work, therefore, for all men intending to be missionaries, and there is also much information in it which is important to students elsewhere. The authors' statements in regard to syphilis and parasyphilitic affections should throw new light on the development of these obscure troubles. There is a picturesqueness about the work which is generally lacking in medical text-books and Drs. Jefferys and Maxwell are to be sincerely congratulated on the success of their task.

Progressive Medicine. Edited by Hobart Amory Hare, M. D., and Leighton F. Appleman, M. D. Vol. IV. December, 1910. (*Philadelphia and New York: Lea & Febiger.*)

A word only is needed to call attention to this last volume of the series which has appeared in the "Diseases of the Digestive Tract and Allied Organs, The Liver, Pancreas and Peritoneum—the Diseases of the Kidneys—Surgery of the Extremities, Shock, Anæsthesia, Infections, Fractures and Dislocations, and Tumors—Genito-urinary Diseases—Practical Therapeutic Referendum." The reviewers are Belfield, Bloodgood, Bradford, Landis and Lavenson, each of whom covers his territory so satisfactorily that no article of real importance on a given subject is overlooked, and there is careful weighing of the merits of each paper referred to.

Physicians Visiting List. (*Philadelphia: P. Blakiston's Son & Co., 1910.*)

Numberless physicians will find this pocket note-book, with its medical tables of incompatabilities, weights and measures, doses, etc., useful, and every physician should carry some such note-book. No one has a perfect memory and doctors should be especially careful to preserve notes and memoranda dealing with their patients. The 60th issue of this Visiting List shows that the publishers have gained a well-earned success with it.

The Care and Training of Children. By Le Grand Kerr, M. D., etc. (*New York and London: Funk & Wagnalls Co., 1910.*)

The author has written other works on babies and children, all marked by careful thought, and good judgment. This small, neatly printed volume is a helpful guide for young parents, and many older ones could also read it with advantage. Dr. Kerr talks simply and pleasantly about The Child's Room, Clothing, Diet, Bathing, Education, Punishment, Government of the Child, Child's Friends and Amusements, and other matters of importance to the welfare of a child. The question of the correct up-bringing of children is a ever vital one, and this book is sure to lead some mothers and fathers to do better than they would have done without it.

Bismuth Paste in Chronic Suppurations—Its Diagnostic Importance and Therapeutic Values. By Emil G. Beck, M. D. With an introduction by Carl Beck, M. D. And a Chapter on the Application of Bismuth Paste in the Treatment of Chronic Suppuration of the Nasal Accessory Sinuses and the Ear. By Joseph C. Beck, M. D. Illustrated. Price $2.50. (*St. Louis: C. V. Mosby Company, 1910.*)

Through articles in the medical journals Beck's original use of bismuth paste in this form of suppuration has been known for several years, and his practice has been followed with more or less success by many surgeons. At last in book form he presents his experience with this method of cure, and the profession will be grateful to him for it, since this is the first authoritative and full report on this subject which is of real importance in surgery. One of the values of this book is that it is not too long, and the matter is so well presented that its readers can easily read it through. Its essential importance is in making clear to practitioners the real and great values of bismuth when properly used in these surgical conditions.

The Dawn of the Health Age. By Benjamin Moore, M. A., D. Sc., M. R. C. S., L. R. C. P. Price $1.40. (*London: J. & A. Churchill. Philadelphia: P. Blakiston's Son & Co., 1911.*)

Dr. Moore's object in writing this book, is, as explained in the preface, "to demonstrate on clear, broad lines, the necessity for entirely remodelling the present system of medical service, in the interests of the whole community." Much remodelling of medical service is necessary here as well as in England, and those interested in the larger problems of the profession will be glad to read this book, that they may see the difficulties, and study the cure proposed by the author. He suggests that all hospital appointments should be under the control of the State, and all doctors be paid by the State, so that there should be no rivalry amongst them, and so that the State might be better served. To stamp out tuberculosis he thinks the State should have the right to segregate all suffering from this disease until they died or were cured. Such radical measures do not seem feasible at the present moment, but who can foresee what changes will come about sooner or later in society, or what reforms a socialistic government might introduce.

Report of the International Commission on the Control of Bovine Tuberculosis. Reprint from 47th Annual Report of the American Veterinary Medical Association, September, 1910.

The Commission is composed of men well fitted by their knowledge and experience to deal with the problem under consideration, and their report evidences a careful review of the many factors entering into this difficult question. Their recommendations are made under four headings: (1) Education and legislation. (2) Location of tuberculosis. (3) Dissemination. (4) Disposition of tuberculous animals.

The recommendations under the head of education are very wise and practical and may be regarded as the first and most fundamental step in the entire campaign. Without intelligent coöperation on the part of the farmers, dairymen, butchers and consumers, legislation will fail.

The value of the tuberculin test is fairly defined and the recommendations for its use and safeguard from abuse are clearly set forth.

Until more widespread organization occurs—State Livestock Sanitary Boards, or other competent authority for wisely enforcing laws relative to bovine tuberculosis—little can be expected from legislative enactment.

The recommendations of means by which owners of herds can prevent their infection, or eradicate tuberculosis, or build up new herds free from tuberculosis are practical and deserve a more extensive trial than they have yet received in this country.

W. L. Moss.

Remedial Gymnastics for Heart Affections Used at Bad-Nauheim. Being a translation of "Die Gymnastik der Herzleidenden" von Dr. Med. Julius Hofmann und Dr. Med. Ludwig Pöhlman, Berlin und Bad-Nauheim. By John George Garson, M. D., Edin., etc. With fifty-one full-page illustrations and diagrams. Price $2. (*New York: Paul B. Hoeber, 1911.*)

With a few pages to explain the value and proper use of gymnastics in diseases of the heart, supplemented by photographs with accompanying descriptions of the exercise shown, this book should appeal to many a practitioner, who has not had the chance to learn what gymnastic exercises can be safely practised by a patient with heart trouble, and how his heart will be strengthened by them. But the physician must be able first to make a careful diagnosis of the condition of the patient, for a hap-hazard treatment of heart disease with gymnastics would quickly prove fatal in many a case. The diagnosis having been made then this work can be safely used, and can be recommended without danger.

Emanuel Swedenborg's Investigations in Natural Science and the Basis for his Statements Concerning the Functions of the Brain. By Martin Ramström. University of Upsala, 1910.

The 200th anniversary of the University of Upsala has inspired an interesting review of the published and unpublished conceptions of one of the most remarkable men of the Swedish nation—Swedberg, later ennobled and renamed Swedenborg. Born in Stockholm January 25, 1688, be obtained his philosophical degree 1709, became assessor extraordinary of the Royal College of Mines 1716, was ennobled 1719, ordinary assessor 1724, retired 1745, and died in London March 29, 1772. A man of extraordinarily wide interests and wide opportunities, he has achievements in mathematics, in geology, neurology, chemistry, physics and cosmology, and finally he threw himself with intense zeal into anatomical and physiological studies which are published as "Œconomia Regni Animalis," dealing mainly with the blood, the brain and the soul. He foreshadowed the theory of epigenesis. His main interest in the brain lies in his emphasis of the "sphærula," or cerebellula of the cerebral cortex (now recognized as the cell-bodies), from which fibers arise and extend to medulla and cord and all parts of the body. The cortex is the seat of the sensorium commune and also of the motility. Each little cell lies in its own cavity and has its own fiber and a certain independence; but they also work together in groups; and he suggests that the relation of the convolutions to the one or the other muscle in the body could only be established on living animals by puncture, section and compression of the convolutions. He also accepted subordinate secondary motor centers for automatic and habitual movements in the medulla and cord. The soul in turn is localized in the cortex and if it were not for the difficulty about immortality he would identify it with the fluidum spirituosum of the cerebellula. "It amounts to the same thing if we see in this fluid the soul itself or only its faculty of imagination and judgment, for the one cannot be thought of without the other." In a manuscript, partly published in London 1882 and 1887, under the title "The Brain," he extended his work and even developed the fact that in the motor representation in the anterior parts of the brain, the feet depended upon the highest parts, the abdomen and thorax on the middle and the face and head upon the third lobe.

In his historical study, Ramström aims to account for the foundation of Swedenborg's conclusions. The data seem to have

ail not in his influence on the reader a spur to direct investi-
ation.

reatises of Fistula in Ano, Hemorrhoids and Clysters. By John *Arderne.* From an Early Fifteenth Century Manuscript Translation. Edited with Introduction, Notes, etc., by D'Arcy Power, F. R. C. S. Eng. Price 15s. (*London: Kegan, Paul, Trench, Trübner & Co., and Henry Frowde, Oxford University Press, 1910.*)

Though the operative material of mediæval surgeons was neces- ily quite limited in amount, no one can come away from their itings with anything but respect for the extensive knowledge y managed to accumulate with inadequate clinical methods. is is the feeling which Arderne's work awakens. Its phrase- gy is charmingly quaint; and it abounds in shrewd, wily ad- e, and a sly, though none too refined, humor. The author was ' type of surgeon who has happily never been absent from gland—an English gentleman as well as a fine surgeon"; and h of what he writes has to do with the ethics of the pro- ion: which is quite intelligible when one remembers the e too savory reputation of the surgeons of the day, and their hods, not always above reproach. He is strong for caution; ises against undertaking a case, except deliberately; always tions the untoward results that may be expected; and in- on the surgeon having a definite understanding with the ent's relatives—even to an advance-collection of a portion of fee—before an operation is done. If the emphasis laid on sort of worldly wisdom seems out of proportion, one has to ember how precarious was the standing of the surgeon in days; and to recall King John of Bohemia, who sewed up French leech in a sack and threw him into the Oder because ad not cured his cataract as he had promised.

derne advised the operative treatment of fistula and devised lessly cumbersome instruments for it; but the great ad- e he made seems to have been in the avoidance of the cor- e and irritating after-treatment used by every one else. n and again he emphasizes the importance of letting wounds .

morrhoids—which, unless they bled too profusely, he re- d as of use in preventing "mania, melancolia, pleuresis, isy, passions of the spleen," etc.—were treated by local appli- ns.

Treatise of Arderne belongs to the series published by the English Text Society; and has been excellently edited by y Power. The antiquated spelling, and many of the pecu- es of the original type have been retained. This has en- d the attractiveness of the book; and though it has made it hat more difficult reading, the text has been rendered quite ible by an excellent running commentary of marginal notes.

Official Announcement of the University of Vienna about t-Graduate Medical Work, published by Urban and Schwarz- of Berlin and Vienna, will be sent to anyone on applica- o Rebman Company, New York, free of charge. This let is printed in German, but accompanied by an English ench translation, so that no prospective student need have ifficulty in understanding exactly the condition of post- te work in that university before going there.

Rules of Ophthalmic Practice. By Gustavus Hartridge, R. C. S., etc. Golden Rule Series, No. VII. Fifth edition. *ristol: John Wright & Sons, Ltd. London: Simpkin, rshall, Hamilton, Kent & Co., Ltd., 1910.*)

this small work is very popular is shown by the appear- its fifth edition. This series of "Golden Rules," volumes easuring only 4¼ by 2¾ inches, seems to have had marked success among English practitioners, and there is no doubt that the rules are well chosen, but there is danger that such books, no matter how well prepared, lead to superficiality of work. The practice of medicine cannot be regulated by hard and fast rules, even when "golden."

"*Salvarsan*" ("*606*") (*Dioxy-Diamido-Arsenobenzol*). *Its Chemistry, Pharmacy and Therapeutics.* By W. Harrison Martindale, Ph. D. Marburg, F. C. S., and W. Wynn Westcott, M. B. Lond., D. P. H. Price $1.50. (*New York: Paul B. Hoeber, 1911.*)

The Treatment of Syphilis by the Ehrlich-Hata Remedy (*Dioxy-diamido-Arsenobenzol*) *A Completion of the Published Observations.* By Dr. Johannes Bresler. Second edition. Much enlarged, with portraits of Ehrlich and Schaudinn. Translated by Dr. M. D. Eder. With an Abstract of the Most Recent Papers. Price $1. (*New York and London: Rebman Company, 1911.*)

The work by Bresler supplements that of Martindale and Westcott to a certain extent, for even in theirs there is some account of the papers abstracted by him. Both books are useful and arrive at a most opportune moment when "606" is being put on the market. Practitioners must carefully study all the latest information on this subject and we recommend heartily "Salvarsan" in which they will find the proper methods of giving this drug set forth clearly, and its dangers noted. Martindale and Westcott have prepared an excellent manual, containing what is most essential for the instruction of the profession at large on this new remedy.

The Principles of Bacteriology. A Practical Manual for Students and Physicians. By A. C. Abbott, M. D., Professor of Hygiene and Bacteriology in the University of Pennsylvania. Eighth edition. Thoroughly revised. Illustrated. (*Philadelphia and New York: Lea & Febiger, 1909.*)

The 8th edition of this well known book scarcely calls for extended comment. Naturally a large portion of the text is practically unchanged. As the author remarks in the preface: "The advances in bacteriology which have occurred since the issue of the 7th edition have been considerable, but not such as to affect materially the fundamentals essential to the education of the beginner." Parts of the book, however, have been rewritten, notably the chapter on infection and immunity, and the work has been brought up to date in other respects, as far as is compatible with the purpose it is intended to serve; namely. as a manual for students and practitioners of medicine.

A Handbook of the Surgery of Children. By E. Kirmisson, Professor of the University of Paris; Surgeon to the Hospital for Sick Children, etc. Translated by J. Keogh Murphy, M. C. (Cantab.), F. R. C. S., etc. Price $7. (*Henry Frowde, Oxford University Press. Hodder and Stoughton, Warwick Square, E. C., 1910.*)

The author says he has left out all pure theory, history, pathological anatomy and pathogeny in order to insist on the knowledge of symptoms, diagnosis and treatment.

He divides all infantile surgery into two great subjects. Firstly, the study of malformations, and secondly, diseases connected with the locomotor apparatus. To these must be joined certain other affections such as appendicitis, mastoiditis, diseases of the throat, empyema, intussusception and lastly prolapse and polypi of the rectum.

The book is separated into four parts. Part I, 280 pages. Surgical affections of congenital origin which include, Congenital

Affections of the Back, the Head and the Neck; Congenital Malformations of the Trunk; Malformations of the Extremities. Part II, 75 pages. Injuries in Childhood. Part III, 418 pages. Inflammatory Lesions and Disorders of Nutrition, which are divided into Disorders of the Locomotor Apparatus: Affections of Different Regions. Part IV, 30 pages. Neoplasms or Tumors.

The chapter on anesthesia is by Cecil Hughes. He prefers chloroform, either alone or in mixtures, for anesthesia in children. This is interesting as the majority of anesthesias in this country are with ether, which is safer, in most instances.

The translator has used, as far as possible, the author's own words, and his work is nicely done. He has added a few well considered footnotes of his own.

The book is well gotten up and is profusely illustrated.

While some of the authors' ideas are at variance with those generally accepted nevertheless the book accomplishes its purpose, and will be a helpful addition to the other works on the surgery of children which have appeared in the last two years.

J. S. D.

Bier's Textbook of Hyperæmia as Applied in Medicine and Surgery. By PROFESSOR DR. AUGUST BIER, of Berlin. Only authorized translation from the sixth German revised edition. By DR. GUSTAVUS M. BLECH, Professor of Clinical Surgery, Illinois Medical College. With thirty-nine illustrations. Price $4. (*New York: Rebman Company.*)

The chapter on the treatment of acute inflammation and suppuration has been changed and enlarged. Chapters on the treatment of keloids, tenosynovitis and diseases of the skin have been inserted. An index has also been added.

The work is well translated and nicely gotten up. There is an extensive bibliography throughout. The author takes up certain criticisms of his methods and demolishes them.

There is no doubt of the efficacy of hyperemia in a number of conditions, and we have all seen good results following its proper use, but the method is hardly a panacea as one might believe after glancing over the volume.

J. S. D.

The Vegetable Proteins. By THOMAS B. OSBORNE, Ph.D., etc. Price $1.20. (*London, New York, Bombay and Calcutta: Longmans, Green & Co., 1909.*)

This little volume of about 100 pages by the well-known authority on vegetable proteins, Thomas B. Osborne, of New Haven, Conn., is one of the Monographs on Bio-chemistry edited by Plimmer and Hopkins. It is a clear, concise, carefully written exposition of the present state of knowledge in this somewhat confusing branch of chemistry. Dr. Osborne has himself been the chief contributor in this field for a number of years, and the book is, therefore, not merely a review of the work done by others but an expression of his own views. Outside of Osborne's own laboratory comparatively little research on vegetable proteins has been carried out since the investigations of Ritthausen which were not generally credited immediately after their publication, but which are now abundantly approved largely by the investigations of the author of this book.

The volume is divided into 11 chapters in which the occurrence of proteins in different parts of plants and their general characteristics, the isolation and separation of seed proteins and their reactions in respect to solubility, precipitation, denaturing and hydrolysis are considered with great detail. The classification of vegetable proteins which Dr. Osborne employs is based upon the work of the American committee on nomenclature, but at the same time the author points out that the American and English committees appointed to consider this subject are in practical uniformity in their views.

To the medical man the last chapter of the book in which such subjects as tox-albumens, anaphylaxis, precipitins and agglutinins are considered, is naturally the most interesting. The occurrence among plants of reactions which originally were seen with animal tissues is not without deep significance in view of the fact that many of the diseases in man may be traced to microorganisms belonging to the vegetable kingdoms.

The volume is furnished with a most complete bibliography of over 600 references in accordance with the wishes of the editors that each monograph should furnish a complete list of the papers previously published on the subject of which it treats.

JUST ISSUED

THE JOHNS HOPKINS HOSPITAL REPORTS

Volume XVI (1911). 670 Pages and 151 Illustrations

I. Studies in the Experimental Production of Tuberculosis in the Genito-Urinary Organs. By GEORGE WALKER, M. D.

II. The Effect on Breeding of the Removal of the Prostate Gland or of the Vesiculæ Seminales, or of Both; together with Observations on the Condition of the Testes After Such Operations on White Rats. By GEORGE WALKER, M. D.

III. Scalping Accidents. By JOHN STAIGE DAVIS, M. D.

IV. Obstruction of the Inferior Vena Cava with a Report of Eighteen Cases. By J. HALL PLEASANTS, M. D.

V. Physiological and Pharmacological Studies on Cardiac Tonicity in Mammals. By PERCIVAL DOUGLAS CAMERON, M. D.

PRICE IN CLOTH, $5.50. PAPER, $5.00

Orders and remittances should be addressed to THE JOHNS HOPKINS PRESS, Baltimore, Md.

The Johns Hopkins Hospital Bulletins are issued monthly. They are printed by the LORD BALTIMORE PRESS, Baltimore. Subscriptions, $2.00 a year (foreign postage, 50 cents), may be addressed to the publishers, THE JOHNS HOPKINS PRESS, BALTIMORE; single copies will be sent by mail for twenty-five cents each. Single copies may also be procured from the BALTIMORE NEWS CO., Baltimore.

BULLETIN

OF

'HE JOHNS HOPKINS HOSPITAL

Entered as Second-Class Matter at the Baltimore, Maryland, Postoffice.

XXII.—No. 242.] BALTIMORE, MAY, 1911. [Price, 25 Cents

CONTENTS.

PAGE
chard Owen: His Life and Works. (Illustrated.)
By C. W. G. ROHRER, M. A., M. D., Ph. D. 133
rentine Anatomist.
By PEARCE BAILEY, M. D. 140
yology and Obstetrics in Ancient Hebrew Literature.
By DAVID I. MACHT, M. D. 143
sseminated Caseating Tuberculosis of the Liver. (Illus-
rated.)
By WILLIAM SYDNEY THAYER, M. D. 146
tid-Splitting Ferment in the Saliva.
By LOUIS M. WARFIELD, A. B., M. D. 150

PAGE
The Relationship Between the Normal and Pathological Thyroid Gland of Fish. (Illustrated.)
By J. F. GUDERNATSCH 152
Tubercular Bursitis. Two Unusual Cases. (Illustrated.)
By SYDNEY M. CONE, A. B., M. D. 155
A Device to Aid in Keeping the Patient Dry After a Suprapubic Cystostomy. (Illustrated.)
By GEORGE WALKER, M. D. 160
In Memoriam. Dr. Christian A. Herter.
By Dr. W. H. WELCH 161
Notes on New Books 162
Books Received 164

SIR RICHARD OWEN: HIS LIFE AND WORKS.*

By C. W. G. ROHRER, M. A., M. D., PH. D., Baltimore.

ubtless some of you have questioned yourselves concern-
he "why and wherefore" for this paper, entitled "Sir
ırd Owen: His Life and Works." I wish to give three
reasons for thus imposing upon your time and good
e.

ecause of Professor Owen's contributions to medical science.
ecause of Professor Owen's contributions to the allied
es. And,
or purely sentimental reasons. On Monday, April 4, 1898,
I was a second-year medical student, I attended a Young
Christian Association lecture delivered by the late Dr.
C. Gilman, an honored president of this university. In
urse of Dr. Gilman's remarks he gave us the following
it of advice: "Read biography. Familiarize yourself with
es of the good and great."

BIRTH AND PARENTAGE.

ard Owen, the subject of my sketch, was born on
am Street in the town of Lancaster, England, on
), 1804. He was the younger son of Richard Owen,
y of Fulmer Place, Bucks. His grandfather, William
married Elizabeth, daughter of Richard Eskrigge.
chard Eskrigge was high sheriff of Bucks in 1741, and was the owner of Fulmer Place. In an old family prayer book, dated 1713, with a frontispiece portrait of Queen Anne, and further "adorn'd," as the title-page has it, "with 50 historical cuts," there are the following entries in Richard Eskrigge's handwriting:

> Richard Owen, son of William Owen (who was free of the Fishmongers' Company) and of Elizabeth Owen. The said Richard was born in the parish of St. Matthew, Friday Street, December 5, 1754, and baptized the Sunday following. The sponsors were Richard and Elizabeth Eskrigge and Mr. Beresford (Cashier in the Bank of England)."

Then, in Sir Richard Owen's handwriting, a few explanatory remarks are added. He writes:

> The above entries are in the handwriting of my great-grandfather, Richard Eskrigge, of Fulmer Place, Fulmer, Bucks, and relate to the birth of his grandson and heir, my father, Richard Owen.

There is also the following entry in the handwriting of Sir Richard Owen's father:

> Richard and Catherine Owen were married at Preston, November 8, 1792, by the Rev. H. Shuttleworth.

This latter Richard Owen was Sir Richard Owen's father, and the Catherine Owen mentioned was Sir Richard Owen's mother. Sir Richard Owen's mother was of French extrac-

---

read before the Johns Hopkins Hospital Historical
uary 9, 1911.

tion. She was of a Huguenot family of the name of Parrin, who came over from Provence at the revocation of the Edict of Nantes. Her full maiden name was Catherine Longworth Parrin.

Sir Richard Owen's mother, besides being a woman of great refinement and intelligence, was an accomplished musician. Her father before her had supported himself by the profession of music, and she inherited his talent. In appearance she was a handsome, Spanish-looking woman, with dark eyes and hair. Owen himself never tired of speaking of his mother's charm of manner, and of all that he owed to her early training and example.

Sir Richard Owen's father was a complete contrast. Tall, stout and ruddy, his general appearance bore a strong resemblance to the face and figure popularly supposed to belong to the typical John Bull. Nor was his character unlike—bluff, burly, obstinate, and perhaps not particularly brilliant, he was yet possessed of sound common sense.

Childhood and Youth.

Sir Richard Owen as a school-boy succeeded admirably with his studies. In 1808, when Owen was but four years of age, his father, a West India merchant, and often absent from home, included the following sentence in a letter to his wife: "I am glad to know James and Richard come on so well with their studies and are so attentive." James was Professor Owen's elder brother.

After the above preparatory instruction given by an old Quaker lady, Richard Owen, at the mature age of six, was sent to the Lancaster Grammar School to join his elder brother James. Whewell, the famous master of Trinity, who was Owen's fellow-townsman, also received the first rudiments of his education at this school. Another school-fellow who was in the same class as Owen's elder brother was Higgin, late Bishop of Derry.

One of Owen's teachers in the Lancaster Grammar School stigmatized him as "lazy and impudent," and prophesied that he would come to a bad end. This gentleman gave instruction in penmanship. However, in spite of his dismal predictions he managed to teach Owen to write a remarkably clear and neat hand, which hardly varied till within a few years of his death.

"At this period of his life," as Professor Owen's last surviving sister would relate, "Richard was very small and slight and exceedingly mischievous, and he hardly grew at all until he was sixteen."

Owen's family were evidently apprehensive that it would end by his being a "small man." But he soon began to make up for his early want of stature, and when he left the Grammar School he was already a big, awkward lad. At mature manhood Professor Owen's height was six feet in his socks.

At the age of fourteen Richard Owen had given no signs of a taste for the work to which his life was afterwards devoted. Part of a manuscript treatise on "Heraldry" still exists, which he wrote about this time, as well as an elaborately painted coat of arms of the Owen and Eskrigge family.

Early Education.

Soon after leaving school Richard Owen was apprenticed to "Leonard Dickson, of Lancaster, Surgeon and Apothecary," as his indenture dated August 11, 1820, shows. According to the terms of this document Owen was to be provided by his mother with "meat, drink, washing and lodging, and also decent and suitable clothes and wearing apparel," and his master was on his part to teach him the "arts, businesses, professions, and mysteries of a surgeon apothecary and man midwife, with every circumstance relating thereto."

Mr. Dickson died two years after, and Richard Owen was "assigned, transferred, and turned over" by the executors to Joseph Seed for the term of five years, the indenture of this transfer bearing the date of June 19, 1822. The following year Mr. Seed accepted a post as surgeon in the Royal Navy, and Owen was again transferred, by an indenture dated December 13, 1823, to James Stockdale Harrison "Surgeon and Apothecary."

There is appended to the indenture to Seed a certificate in Joseph Seed's handwriting, which contains the following paragraph:

> **Mr. Richard Owen's general conduct during the time he was with me has my highest commendation, and at all times I shall be happy to bear testimony to his most deserving merit, as well as to his respectability.**
>
> **(Signed)** J. Seed,
> Surgeon Royal Navy.
>
> **Lancaster, January 10, 1827.**

The terms of Owen's surgical apprenticeship at Lancaster were never carried out to the full. In October, 1824, he matriculated at Edinburgh University. Some of his lecture cards of admission are still preserved. We gather from these that he attended, besides numerous other lectures, the anatomical lectures of Monro (tertius); but as that worthy gentleman was in the habit of lecturing—so Owen had remarked—from the notes used by his grandfather and his father, both of whom had successively occupied the chair of anatomy before him, these lectures were found to be neither of particular interest nor yet sufficiently up to date. So Owen was constrained to attend the outside course given by Dr. Barclay on practical anatomy, and anatomy and surgery. Though this was an extra which he could ill afford, still he never regretted it, for of all his teachers at Edinburgh it was to Dr. John Barclay that he owed the most. Many times had Owen spoken of the influence that Dr. John Barclay had on his early career, and the sincere affection with which he inspired him. At this time there were but two lecturers on anatomy in Edinburgh—Dr. Monro and Dr. Barclay. Liston entered the arena as number three.

At the end of April, 1825, Dr. Barclay strongly advised Owen to move to St. Bartholomew's Hospital, London, and study under Abernethy. After some consideration, Owen decided to do so, and obtained his college certificates forthwith, all of which are in existence.

terms in his certificate: "I had much reason to be satis- with the mode of his attendance, and the manner in ch he prosecuted these branches of his medical studies" atomy and surgery).

ut Dr. Barclay's chief recommendation was a private let- to his friend Abernethy, which he gave to Owen to take to don with him.

wen was a perfect stranger when he arrived in London. only connection which he had with his northern friends Dr. John Barclay's letter of introduction to Dr. Aber- ıy. This, however, subserved a most useful purpose.

bernethy had just finished lecturing when Owen arrived St. Bartholomew's Hospital. He received Owen rather fly. Owen presented his letter of introduction from Dr. clay. Abernethy read it hurriedly, stuffed it into his cet and made an appointment with Owen to breakfast with at eight o'clock the next morning.

Then Owen presented himself at Abernethy's residence next morning he anticipated anything but an agreeable ference with the great physician and surgeon. He found , to his great surprise, considerably smoothed down and e pleasant in manner. The result of this meeting was, Abernethy offered him the post of prosector for his ıres.

o young Owen this was a very desirable position. It essed several obvious advantages. The prosector was re- ed of the necessity of purchasing his own subjects for ection—no inconsiderable item of expenditure then. This xpected source of revenue was indeed a saving grace to young medical student. Owen's father, having suffered re financial loss, died of a broken heart in 1809, when the Richard was but five years old. The mother and six lren, two sons and four daughters, were not left penni- but their means of support were quite meager. For these ons Richard Owen was early largely thrown upon his own ırces.

om such a chief as Abernethy, Owen could not fail to t. His prosectorship brought with it another decided ad- ıge—the subjects provided for the lectures were in a much ler and fresher condition, comparatively speaking, than ısually the case in those ever-memorable body-snatching To the mind of your humble speaker, this so-called y-snatching" epoch forms one of the most interesting ls in the whole history of medicine. The wonderful of John Hunter's persevering efforts to obtain the body Brien, the Irish giant, who died in 1783, should be read ry medical student.

a rule, Owen fared well at the hands of his professor, bernethy; but on one occasion he provoked Abernethy ger. The lecture was on the human kidney, which had duly prepared. But, unfortunately, in the process aration the adrenal gland became detached, owing, most to its not being quite so fresh as it might have been, a great hurry, the prosector carefully fixed it on -but to the wrong end of the kidney. Abernethy's explanations were somewhat far advanced before he found this out, and not looking very closely at the specimen he held in his hand, he was elaborately describing its structure, as if it had been a normal kidney. When he discovered the error committed, he did not let the occasion pass without bestowing a few flowers of speech upon his young friend.

PROFESSIONAL CAREER.

On August 18, 1826, Owen obtained his membership of the Royal College of Surgeons. He had then just entered his twenty-third year. His diploma is signed by twelve great men, the three most familiar ones being John Abernethy, Astley Cooper and Everard Home (John Hunter's brother-in-law).

Owen set up as a medical practitioner at 11 Cook's Court, Carey Street, Lincoln's Inn Fields, and gradually secured a small practice among the lawyers. He also diligently visited the poorer classes of the neighborhood.

John Hunter having died in 1793, his rare, valuable and unusually complete collections numbering 3970 specimens were purchased by the government for the sum of $75,000 and given into the custody of the Royal College of Surgeons. Down to this time (1826) these Hunterian collections had been sadly neglected. For twenty-five years Sir Everard Home was "going to" prepare a descriptive catalogue of the collections which had been transferred by the government from John Hunter's temporary museum in Castle Street to the Royal College of Surgeons.

Owen's peculiar ability as a dissector had not escaped the eagle eye of Abernethy, then president of the Royal College of Surgeons. Abernethy, who was much concerned at the neglect of the collections formed by John Hunter, which had recently been purchased by the government and handed over to the care of the college, insisted on his old pupil, Richard Owen, undertaking their arrangement. As Abernethy said: "The collection was located near his (Owen's) private residence; he could devote his leisure hours to the work; there was no one else equally qualified to do so." Owen undertook the task, and was thus associated with William Clift, at that time conservator of the college museum, and who subsequently became his father-in-law.

In the year 1828 Owen was appointed lecturer on comparative anatomy at St. Bartholomew's Hospital, an appointment which was the starting point of his career as a lecturer. Early in 1834 Owen was appointed professor of comparative anatomy at St. Bartholomew's.

In April, 1836, Owen was appointed Hunterian professor at the Royal College of Surgeons. To the last days of his life he constantly referred to the gratification which this appointment gave him. As Hunterian professor it was Owen's special duty to deliver twenty-four annual lectures, as illustrative of Hunter's collections.

On the retirement of Sir Charles Bell, of Bell's paralysis fame, from the professorship of anatomy and physiology in the Royal College of Surgeons, in the early part of 1837, Owen was elected to the vacant chair. Owen's full title then became "Hunterian Professor and Professor of Anatomy and Physiology in the Royal College of Surgeons."

Owen now (in 1837) began gradually to relinquish his medical practice in order to devote the whole of his time to scientific research. He had been a practitioner of medicine and surgery for eleven years.

On May 2, 1837, at 5 o'clock p. m., Professor Owen delivered his first Hunterian lecture. The subject of this course of lectures was the microscopical structure and nature of the teeth.

On June 19, 1837, Owen was elected Fullerian professor of comparative anatomy and physiology to the Royal Institution. This professorship Owen was obliged to decline.

Owen filled the position of Hunterian professor of anatomy and physiology at the Royal College of Surgeons for a period of twenty years (1836 to 1856). On May 26, 1856, Owen was appointed superintendent of the natural history department of the British Museum, at a salary of 800 pounds (about $4000) a year. This appointment was originally suggested by Lord Macaulay. The office of superintendent was generally understood to have been created expressly for Owen.

Long after Macaulay had abandoned all other public business, he continued to occupy himself in the administration of the British Museum. In February, 1856, he wrote to Lord Lansdowne with the view of securing that old friend's potent influence in favor of an arrangement by which Professor Owen might be placed in a position worthy of his reputation and of his services. The following is an extract from Macaulay's letter to Lord Lansdowne, in which he proposes that Professor Owen should be constituted superintendent of the whole department of natural history, including geology, zoölogy, botany and mineralogy.

Macaulay writes:

> I cannot but think that this arrangement would be beneficial in the highest degree to the Museum. I am sure it would be popular. I must add that I am extremely desirous that something should be done for Owen. I hardly know him to speak to. His pursuits are not mine; but his fame is spread over Europe. He is an honour to our country, and it is painful to me to think that a man of his merit should be approaching old age amidst anxieties and distresses. He told me that eight hundred a year (meaning 800 pounds a year) without a house in the Museum, would be opulence to him. He did not, he said, even wish for more. He seems to me to be a case for public patronage. Such patronage is not needed by eminent literary men or artists. A poet, a novelist, an historian, a painter, a sculptor, who stood in his own line as high as Owen stands among men of science, could never be in want except by his own fault. But the greatest natural philosopher may starve while his countrymen are boasting of his discoveries, and while foreign Academies are begging for the honor of being allowed to add his name to their list.

Professor Owen entered upon the duties of his new office, that of superintendent of the natural history department of the British Museum, on June 8, 1856. This position Professor Owen held for twenty-eight years, or until he had almost reached the eightieth year of his age.

The superintendency gave Professor Owen an opportunity to do a little outside work. In 1857 Professor Owen was appointed lecturer on palæontology at the Royal School Mines. His first lecture was given on February 26, at Museum of Practical Geology. Amongst the audience, as entry in the diary shows, were many old friends: Dr. Livingstone, Frank Buckland, the Duke of Argyll, with his Sir Charles Lyell and Sir Roderick Murchison.

Towards the end of 1857 Owen was offered and accep an appointment which some years previously, while at Royal College of Surgeons he was obliged to decline; it w the Fullerian professorship of physiology at the Royal Institution of Great Britain.

Private Life.

Professor Owen was one of the most affable of men. H home-life was ideal. In scientific circles he was univers loved and respected. Even those whose views ran counter his own always dealt with him with the highest considerati His earnestness of purpose, his sincerity and frankness, w marked traits of his character.

On July 20, 1835, Professor Owen's thirty-first birth the event took place to which he had so long looked forw namely, his marriage to Miss Caroline Clift. Professor Ow had been engaged to Miss Clift for eight years. It was very quiet wedding, and is thus described in Miss Clif diary:

> July 20.—Richard Owen and I, my father and Harriet Sheppar were in the new St. Pancras Church, Euston Square, by hal past eight o'clock. The Rev. Mr. Laing came immediately aft we got into the vestry, and, Caroline Clift having been lost o the road, Mrs. Richard Owen returned to breakfast at No. 1 Euston Grove; after which my husband, my mother and I se off to Oxford.

This union was blessed with one child, William Owen born October 6, 1837. On October 6, Professor Owen writ in his wife's diary:

> At a quarter-past nine William Owen was born.

The next day there is the entry:

> Papa's joy a little damped by excruciating toothache. Mothe and child as well as possible.

About a month afterwards Mrs. Owen begins the diar again. The diaries of Mrs. Owen, began about the year 18 are now kept almost without a break up to 1873, the year o her death, thus covering a period of at least forty-six years Many of the scenes and incidents in Professor Owen's life which I have incorporated in this paper, have been taken from Mrs. Owen's interesting diary.

Mrs. Owen died May 7, 1873, and by her death Professor Owen lost one who had been his fitting helpmate for nearly forty years, and who had, in her younger days especially, assisted his work in no small degree by her acute powers of observation and by her artistic skill.

Contributions to Medical Science.

Owen's most important contribution to medical science is his discovery of the *Trichina spiralis,* a small nematoid worm which harbors in striated muscle and causes the disease known scopic discovery was de by Owen in the autumn of 1834. At first it seemed erely a curiosity of science. Mr. Wormald, demonstrator anatomy at St. Bartholomew's Hospital, sent Professor ven a piece of human muscle accompanied by the following ter:

> DEAR OWEN.—I send you some sort of organised beings, as I ieve, which occupy the muscles of a subject now under distion at St. Bartholomew's Hospital, and as I know you are een hand for parasitical things from crabs downwards, I send enclosed for your inspection.
>
> Ever yours sincerely,
>
> THO. WORMALD.

Upon examining this piece of muscle, Owen discovered a w entozoon, the *Trichina spiralis*. Owen's nomenclature been slightly changed, and in your recent text-books on thology you will find this parasite spoken of as the *Trichila spiralis*. Owen's paper, entitled "Description of a croscopic Entozoon infesting the Muscles of the Human dy," appeared in the *Proceedings of the Zoölogical Society,* l. III, 1835.

This minute worm is not limited in its distribution to the iscles of men, but when in the human body not unfreently causes death. It is well known as producing the demic trichinosis, which formerly made its appearance efly in Germany, or in such places where diseased pork or tially cooked ham is consumed. Cobbold, in his masterly atise on parasites, appends a list of thirty-three epidemics trichinosis observed in Germany during the first six years mediately following the announcement of Professor Owen's covery of the *Trichina spiralis.*

The *Trichina spiralis* figures conspicuously in Professor eph Leidy's excellent monograph, "Flora and Fauna in ing Animals." Dr. Leidy lays especial stress upon the that the inhabitants of the United States are less ined with entozoa than the inhabitants of other countries. Before leaving this important subject it is intensely interng to note that the medical student who was making the ection at St. Bartholomew's was Mr. Paget, who afterds became the renowned Sir James Paget.

wen was the last great exponent of the so-called "Vertee Theory of the Skull." This theory originated in the le brain of the German poet Goethe, in the year 1790; as greatly elaborated in 1807 by Lorenz Oken, a German omist; and further developed and most ably championed rofessor Owen about the middle of the nineteenth century. essor Owen's views are embodied in his "Report on the etype and Homologies of the Vertebrate Skeleton," pubd in 1846.

e vertebral theory of the skull is based upon the hypothe-at the vertebrate skull consists of four modified or exed vertebræ—in other words, that the skull is the highly entiated anterior end of the backbone.

ile Owen's classic anatomy was faultless, many of his sions were subsequently proven by Huxley to be une. These were Huxley's words:

> The spinal column and the skull start from the same primitive condition, whence they immediately begin to diverge.
>
> It may be true to say that there is a primitive identity of structure between the spinal or vertebral column and the skull; but it is no more true that the adult skull is a modified vertebral column than it would be to affirm that the vertebral column is a modified skull.

Professor Owen conferred an inestimable boon upon medical science by editing two octavo volumes of John Hunter's manuscripts. These two volumes of Hunter's unpublished manuscripts, edited by Owen, appeared in 1860, and are entitled "John Hunter's Essays and MSS." These volumes contain essays on natural history, psychology and kindred topics.

Professor Owen was one of the pioneers in public health work and in sanitation. He was chairman of the original Health of Towns' Commission. Sir Henry Littlejohn, the man who made the first sanitary survey of the city of London, mentioned by Dr. Osler in his recent magazine article entitled "Man's Redemption of Man," served with Professor Owen on this commission.

Professor Owen was also a member of the Commission of Sewers and of the Royal Commission on Smithfield Market and the Meat Supply of London.

CONTRIBUTIONS TO COMPARATIVE ANATOMY AND PHYSIOLOGY.

Owen's contributions to comparative anatomy represent his most exhaustive work. These are largely embodied in his three-volume work, "On the Anatomy and Physiology of Vertebrates," and his one-volume work, "On the Anatomy and Physiology of Invertebrates." Owen was the leading anatomist of the age, and the leading vertebrate anatomist of all time.

An observation which Owen made on the generative organs in the muridæ or mouse and rat family is of interest. This was mentioned in his Hunterian lectures for 1840. The subject of the lectures for this year was "The Comparative Anatomy of the Generative Organs and the Development of the Ovum and Fœtus in the Different Classes of Animals." In these lectures Professor Owen describes for the first time, as separate and distinct glands, the "small glands with a granulated exterior" situated adjacent to the seminal vesicles in the rat and mouse. Previous investigators had described these glandular structures as part of the prostate gland.

Owen also rendered great service to comparative anatomy by pointing out the distinction between homology or structural resemblance and analogy or functional resemblance.

CONTRIBUTIONS TO ZOÖLOGY.

Owen's contributions to zoölogical literature are almost as innumerable as the sands of the sea. His first zoölogical paper, written in 1830, was "On the Anatomy of the Ourang-outang." In 1832 Owen published his "Memoir on the Pearly Nautilus," the description of which seemed to have given his mind a bent in a definite direction. This was Owen's first work which attracted the attention of scientific men. In the same year Owen published a paper "On the

Mammary Glands of the *Ornithorhynchus paradoxus,*" and another "On the Generation of Marsupial Animals." In 1863 Owen published his "Memoir on the Aye-Aye."

CONTRIBUTIONS TO PALÆONTOLOGY.

Owen was the first to identify the mammoth, an extinct hairy elephant, and assign it to its proper place in the zoölogical world. Owen was also the first to properly describe the *Archæopteryx,* an extinct bird possessing reptilian characters and supposed to be the transition link between reptiles and birds. The *Megatherium americanum,* an extinct ground-sloth from South America, was the subject of considerable controversy until the appearance of Owen's memoir.

Owen's most notable contributions to palæontology are contained in his monograph on the "Extinct Wingless Birds of New Zealand." Herein Owen describes with characteristic clearness and thoroughness the apteryx, the dinornis, and the notornis, all extinct birds of New Zealand; and in an appendix he describes the extinct dodo of Mauritius, the garfowl of Newfoundland, and the solitaire of Rodriguez.

Professor Owen described six distinct species of the genus dinornis, ascending respectively from the size of the great bustard to that of the dodo, of the emu and of the ostrich, and finally attaining a stature far surpassing three of the once-deemed most gigantic of birds. This latter is the *Dinornis maximus,* or great moa, a large struthious bird "of a heavier and more sluggish species than the ostrich." Its greatest height, as determined by Professor Owen, was probably sixteen feet.

MISCELLANEOUS CONTRIBUTIONS.

Professor Owen was the most sought-after man in scientific England. He played a considerable rôle in the discovery of the remains of John Hunter, and in their removal from the vaults beneath St. Martin's Church to Westminster Abbey. These events transpired early in 1859, or nearly sixty-six years after John Hunter's death.

All through Owen's life he was regarded as legitimate prey to the numerous inquirers as to the nature and habits of such fabulous monsters as the cockatrice, the phœnix and the bunyip. Even the question of the existence of a sea-serpent was referred to Owen. In 1848-1849 this "Great Sea-serpent" was alleged to have been seen no less than 187 times. The officers and crew of H. M. S. *Dædalus* also gave a description of this sea-monster. In a letter to the Prince Consort, Professor Owen states his opinion that the "animal" seen from the deck of the *Dædalus* was the head and track of a great seal, or sea-lion. About this time there was another sea-serpent seen, of which the particulars were sent to Owen by the Duke of Northumberland. This Owen demonstrated to be the ribbon-fish from the drawing which was sent. *Punch* soon had a parody on the subject, modeled after the famous Mother Goose rhyme, "Who Killed Cock Robin?" *Punch's* lines began:

> "Who killed the sea-serpent?"
> "'I,' said Professor Owen."

"Scotched, not killed," was Owen's comment on th

Owen attempted a classification of animals, based on nervous system. He also founded the science of "Od tography," or the natural history of teeth.

Even obstetrics was not neglected, because in 1842 O wrote a paper entitled "Notes on the Birth of the Giraf the Zoölogical Society's Gardens, and description of the membranes, and of some of the natural and morbid appe ances observed in the dissection of the young animal."

SUMMARY OF LIFE WORK.

Professor Owen's active working life covered the phen enal period of sixty-five years. His first two papers were pathological subjects, and were read before the Abernet Society in 1826: one "On Encysted Calculus of the Urin Bladder," and the other "A Case of Gluteal Aneurism w Ligature of the Internal Iliac." Owen's first surgical pa was published in 1830. Its subject was "An Account of Parts concerned in the Aneurism for the Cure of which Stevens tied the Internal Iliac Artery at Santa Cruz in Year 1812." Owen's last paper was written in 1889, w its venerable author was eighty-five years of age. It was e titled "A Monograph on the British Fossil Cetacea from Red Crag."

Owen's published works number 642. These embrace boo and monographs in every department of natural history—zoölogy, comparative anatomy, geology, botany, palæontolog anatomy, physiology, geography, chemistry and public health. Owen was one of the earliest workers with the microscope, an a founder and charter member of the Royal Microscopica Society.

Owen received inspiration from the great Cuvier, whom h met in 1831. Owen was called "the British Cuvier."

Owen manifested a great love of chess, of music and of gardening. He was an accomplished 'cellist.

The story of Owen's life has been admirably written by his grandson, the Rev. Richard Owen, M. A. It comprises two volumes. The data contained therein have been largely gleaned from about 1200 of his own letters, written chiefly to his wife and sisters, and from more than 15,000 letters which have been preserved from the voluminous correspondence which Professor Owen received during his long life.

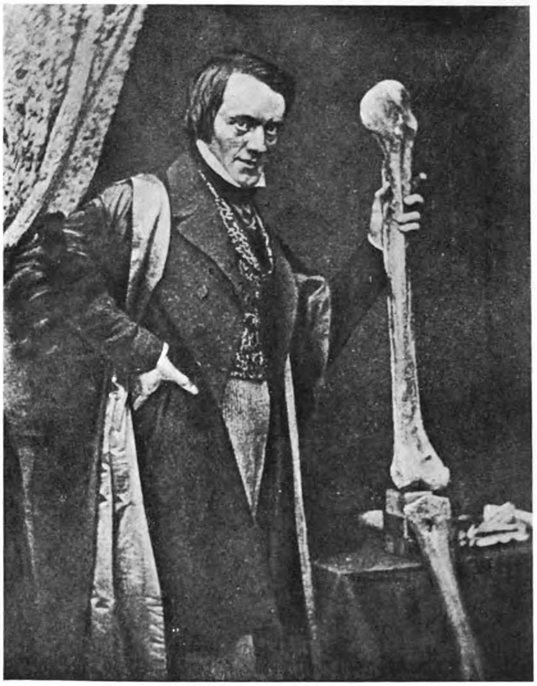
DEGREES AND HONORS.

Professor Owen received four honorary degrees, includin D. C. L. from Oxford and LL. D. from Cambridge. He was awarded fourteen medals and was a member of eighty-three learned and scientific societies. These include the Royal Society, of which he was elected Fellow in 1834, and the Linnæan Society.

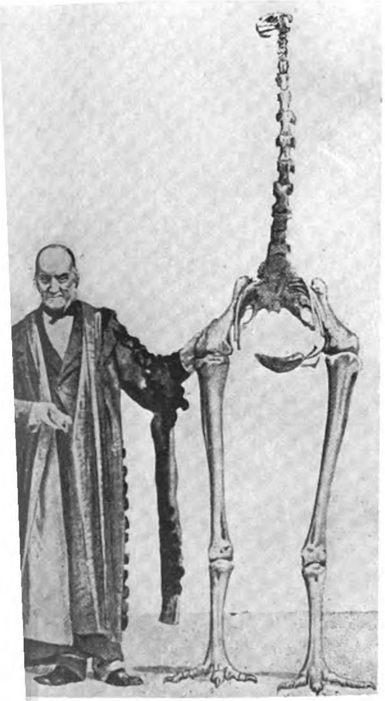
OWEN AND EVOLUTION.

Professor Owen, being of deep religious convictions, was a sworn foe of evolution. Owen's works teem with references to the "Divine plan" and the "will of the Creator." But

Professor Owen at the Age of 22 Years.



Professor Owen in His Prime—Aged 42 Years—as He Lectured. He Holds a Bone of the Dinornis Maximus.



essor Owen—Aged 73 Years—and e Skeleton of Dinornis Maximus.

Professor Owen—Aged 85 Years—and His Granddaughter.

vancement of Science met in Oxford, England. That this ittle for evolution should take place at this time was a foreone conclusion.

But only one man in the whole world had the courage to penly oppose Professor Owen's views or dissent from his pinions. This was a rising young anatomist twenty-one ars Professor Owen's junior. It was none other than that eat master-mind of the nineteenth century, namely, Thomas enry Huxley. Everybody knows who Huxley was. Huxley's me is inseparably blended with the early history of *this* eat institution of learning; because it was Huxley's most mous pupil, Dr. H. Newell Martin, who organized the biogical department in this university.

Huxley plead eloquently for the cause of evolution. Owen, presenting scientific England, and Bishop Wilberforce, repsenting the church and the populace, as eloquently opposed

Bishop Wilberforce, in the course of his remarks, turned Huxley and asked him if it was on his grandfather's side on his grandmother's side that he was related to an ape. When Bishop Wilberforce had ended his speech, Huxley ose to his feet, and in his usual calm but earnest demeanor ade the following reply, which has become historical:

> **'I asserted, and I repeat, that a man has no reason to be hamed of having an ape for his grandfather. If there were an cestor whom I should feel shame in recalling, it would be a *in*, a man of restless and versatile intellect, who, not content th an equivocal success in his own sphere of activity, plunges o scientific questions with which he has no real acquaintance, ly to obscure them by an aimless rhetoric, and distract the attion of his hearers from the real point at issue by eloquent gressions, and skilled appeals to religious prejudice.**

However, later in life Owen's heart softened toward evolun and evolutionists. Shortly after Louis Agassiz's death, ich occurred December 14, 1873, Professor W. J. Stillman this country visited London and interviewed Professor en. Professor Owen spoke feelingly of Agassiz's death, l lamented the fact that our great naturalist had held out obstinately against evolution. Professor Owen's words e: "If I could have had half-an-hour's conversation with ssiz, I believe I could have convinced him of the truth of ution."

fter Owen's death in 1892, Huxley wrote a meritorious y on "Owen's Position in the History of Anatomical nce." It forms the closing chapter in Vol. II, "Life of n."

CLOSING YEARS.

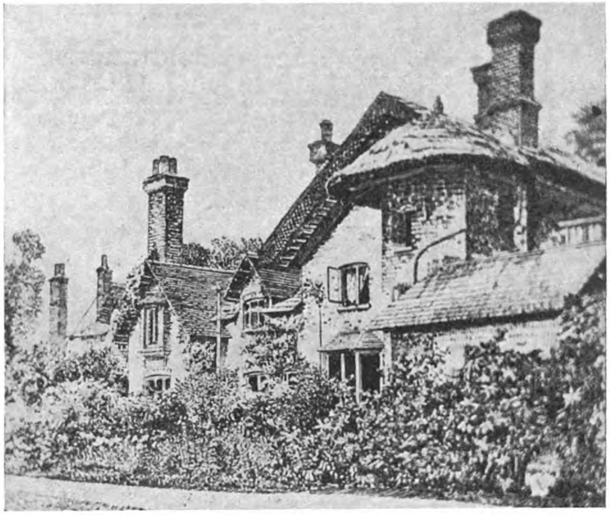
n January 5, 1884, Professor Owen was knighted, and eforth we shall speak of him as Sir Richard Owen.

r Richard Owen's last days were spent at Sheen Lodge, eautiful home in the suburbs of London, presented to him er Majesty Queen Victoria, in recognition of his services. Richard Owen enjoyed reasonably good health, notwithling his excessive mental application. For twenty years d suffered with chronic bronchitis. Early in 1890 he stroke of paralysis, from which he never entirely recovered. But he rallied from it in marvelous way. From this date on, his hearing became visibly affected.

On August 30, 1892, his old friend, Sir James Paget paid him a visit, and tried to converse with him; but Sir Richard, owing to his great prostration, was unable to sustain the effort long. In reply to the repeated inquiries of Dr. Palmer, his physician, Sir Richard invariably answered: "I feel no pain at all, but I have no desire to rise from this bed."

Towards the end of November Sir Richard grew gradually weaker, and began to take less and less nourishment. From the first week of December he never showed the slightest disposition to rally. On December 16 he ceased to recognize those who were standing around him. His death occurred a little before three o'clock on Sunday morning, December 18, 1892.

Sir Richard Owen's death was not due to any definite disease, but to a gradual decadence of all the vital functions. His days had been bounteously prolonged. He was in his eighty-ninth year.



SHEEN LODGE, RICHMOND PARK.

The news of Sir Richard Owen's death, like that of Agassiz and of Darwin, created widespread regret throughout the civilized world. The people of all nations, regardless of race or creed, realized that a great figure, not only of the age but of the century, had passed away. Indeed, the world was made poorer by Sir Richard Owen's death, because it lost an untiring scientific worker and a most genial, kind-hearted man.

THE JOHNS HOPKINS HOSPITAL REPORTS.

Vol. XIII, Studies in Urological Surgery—605 pages, with 6 plates, 201 figures and 1 colored chart.

Vol. XIV, Studies in Hypertrophy and Cancer of the Prostate—632 pages, with 97 figures. Price per volume in paper, net $5, in cloth, $5.50.

Orders and remittances should be made to

THE JOHNS HOPKINS PRESS, BALTIMORE, MD.

A FLORENTINE ANATOMIST.*

By Pearce Bailey, M. D., New York.

It was the peculiar good fortune of Leonardo da Vinci to be sought after and applauded during his life and after it to attain what he thought most worth having, permanent fame. Few men whose names have grown greater with succeeding centuries have had such praise from their contemporaries. He was the divine genius, the second Appeles, the man who could do anything. Kings and Popes sought him for his personal charm quite as much as for his constructive genius. Francis I told Cellini that no mortal had ever known as much as Leonardo knew, not only in the arts but in everything else. "Nature had so endowed him," wrote his contemporary biographer, Vasari, "that whenever he put forth thought, will and effort he showed such divine achievement that no one has ever equalled him in readiness, activity, quality of product, amiability and grace."

It is not necessary to define the place posterity has accorded him in the art which is his chief glory. But Stevenson gracefully vouches for his personal qualities by counting him one of the two men he ever knew or heard of worthy of a woman's falling in love with; and as the beginnings of science are day by day being unearthed from old manuscripts, almost as many champions are coming forward now to prove him a pioneer genius as there were then who praised and loved him during his life. Great as are his works of art, the most impressive legacy he left are the evidences of the universality of his genius.

> Philosophe, physicien
> Rimeur, bretteur musicien
> Et voyageur aerien.

He was all that, but far more. He caught from the blue ideas that had occurred to no one before, and now are everybody's. He made definite impressions on geology, astronomy, engineering, mechanics, botany, zoölogy, physiology, anatomy. He made no great discoveries. But he foreshadowed all discovery from the theory of cosmic unity to the rural free delivery and the lighter than air machines. He is to be judged by his insight and the breadth of his conceptions rather than by his finished products. What he did produce was of such a high degree of excellence that it is impossible to imagine his doing anything badly.

He had the will to attack, without which no one can be first. In his note-books may be found frequent phillipics against alchemists, necromancers, astrologists and physicians, all of whom, in his day, were opposed to the scientific idea. A thinker who can twist a horseshoe with his hands as though it were lead is rarely one to keep his views to himself; and we may think of him as a noble figure with a long beard who wore a red cloak which reached to his knees; one who defied the fashions, a militant missionary of freedom of thought and progress. Leonardo's love of nature and his profession of sculptor and painter early led him to a study of animal structure. He made notes for a book on how birds fly, and another on the anatomy of the horse. And with the help of chance association or his policy of thoroughness, he became the first to know how the parts of a man are welded together to make him a mechanical unit.

One cannot appreciate what this meant in originality and daring without first knowing how little medicine was developed before the Renaissance. If we look back to the early growth of anatomy as an exact and special study, three landmarks stand out clearly between the misty beginnings and the time, in the third century, A. D., when rational knowledge held in the bosom of the church, went to its long sleep.

These landmarks are Greece with Hippocrates towering over everything, Alexandria with its famous school, and Rome in the time of Marcus Aurelius, when Galen established anatomical teachings which were to be blindly followed for a thousand years.

Hippocrates (d. 380 B. C.) did little more for anatomy than to crystallize the vague conceptions of his predecessors, none of which were based on human dissections. The laws of Greece required prompt burial of the dead, and that the buried dead be left to sleep in peace. The few anatomical facts, therefore, which Greek medicine separated from myth and tradition were gleaned by such disclosures of anatomical structure as were made by the wounds and injuries of war, by unburied bodies which had been separated into their integral parts by the elements, and by sacrificial animals. As a result, the anatomy of the times boasted few proved facts. It was a mixture of symbolism, conjecture and philosophical speculation, too uncertain for rational medicine to build on.

Eight years after the death of Hippocrates, a great change in methods and results was worked at Alexandria. In this famous cosmopolitan center of learning, the home of Theocrates, of Euclid and Archimedes, light was thrown on intimate human structure for the first time. It was made possible by the genius of the Ptolomies. These rulers not only permitted dissection but encouraged it, and in order to remove the odium which had hitherto attached to the desecration of the human temple, used the scalpel themselves occasionally.

The school flourished for three hundred years and lived a thousand. But the conquest by Rome brought Roman customs and traditions. With the fall of the Ptolomies, at about the beginning of the Christian era, dissection again fell into discredit and disuse; and the burning of the library was a blow to the intellectual supremacy of Alexandria from which it never recovered. Anatomy, however, again saw the sun in Galen (200 A. D.). This man, perhaps the most virile figure in the history of medicine, worked with untiring industry, practiced, traveled, wrote and initiated many original methods of experiment. His career was like that of many a Meonality survived his mortal death for many centuries. activity of his scalpel was limited to animals. His works, ch made no mention of human dissection, became weapons he church. They served as means of curbing the restless iiry of science, as did the monastic interpretations of the ptures in suppressing those wishing to go deeper into the stion of man's spiritual welfare. When, in the beginning he Renaissance, earnest truth seekers, no longer content ı the time-worn and erroneous teachings, began to clamor rational means of renewing and extending anatomical wledge, the church would answer: "Go to your Galen; he written truly and all you need to know." Even after ıan dissections had begun to show how widely Galen's omy of animals differed from human anatomy, new prots, opponents of progress, would arise, who preached nst the innovations and upheld the thousand-year-old er-. The cry "back to Galen" was heard as late as the time ylvius in 1550.

---

* Paper read before the Johns Hopkins Hospital Historical Society, October 24, 1910.

alen was a Greek and wrote in his native language. The bians were the first to take over and elaborate his writings heir own language. From the Arabic translations they retranslated into Latin, in which form, garbled and ilated, they first became accessible to Italian students. y were widely copied in the eleventh and twelfth centuries. haps too wide circulation was the cause of their downfall. ıny rate, in the thirteenth or fourteenth century, human omy began to be heard of again for the first time since the candrine days. The school of Salerno ordered dissections he last half of the thirtenth century, and in 1308 the or council of Venice ordered the medical faculty to make w autopsies every year. But the name above all others ciated with the new movement was Mondinus, the little nondo, as he was affectionately called, who, as professor ader of medicine in the University of Bologna, performed irst human dissection in 1315. He could not push his ies far, but his 44-page compendium, which was first d in MSS., and later printed in many editions, was ly used by the medical schools of Italy and Germany for years. Mondinus made no material advance on Galen's ings. Many of them he took over bodily without knowing it was animal and not human anatomy he was teaching. heralded the science he could not found. Raising his against traditional authority, as he did in his preface, he said, "non observans stilum altum sed secundum alem operationum," he stands the John the Baptist of my. The fruits of his example were slow in ripening. rejudice against mutilation of the human body for any se died hard. The rights of the dead were held sacred. soul, even of executed criminals, was supposed to be with the body. Anatomists, therefore, pursued their in the face of viligant opposition, and found thembecoming midnight marauders.

as probably more to stop grave robbing than to further dy of anatomy that in 1405 the University of Bologna authorized students of the third year to witness two demonstrations. Both students and masters alike were forbidden to dissect without permission. In 1442 another decree provided the rector of the university with two bodies a year, but no bodies of any one dying nearer than thirty miles of Bologna. So that in the middle of the fifteenth century, when Leonardo da Vinci was born, in the most celebrated university in Europe, it was practically impossible for students to learn how the machine they were to care for was put together. They were not permitted to dissect, they had no books, and such anatomical drawings as were in existence were of no more use than the title page of our *Farmers' Almanac.* This was all changed by Vesalius of Brussels. His treatise on anatomy, *de Fabrica humani corporis,* which Dr. Osler, in the copy of the original edition he presented to the New York Academy of Medicine, calls "the greatest medical work ever printed, the one from which modern medicine dates its beginnings," has for all time crowned Vesalius as the founder of anatomy.

But between the prophecy of Mondinus and the achievement of Vesalius came a man who cannot be overlooked in the history of anatomy, though most of such histories overlook him. A man who inaugurated modern anatomical methods; who studied voraciously, saw keenly and drew with matchless skill what his scalpel brought in sight. This was a man who could give only a small fraction of his time to anatomy, Leonardo da Vinci. Vesalius' book was published in 1543. The great Italian's notes and drawings, made not later than 1510, lay unknown for centuries.

He did his work in Florence and Rome, but probably most of it in Milan. In 1842 he left Florence for the Lombardy capital either to contribute to the gaiety of the court with his famous rhymes and allegories, or to construct the Sforza equestrian statue, or to play on the horse's head-shaped silver lute he had made himself. There, although occupied with the canalization of the rivers and with painting The Last Supper, he found time to carry on dissections. Perhaps he owed his opportunities for the latter to de la Torre, the professor of anatomy at the near-by University of Pavia; perhaps the opportunity came to him by reason of his popularity and charm of manner. "He was so godlike and of such power of persuasion," writes Vasari, "his reason and memory aided him to such a degree, and he could make his views so clear by means of his drawings, that he could convince and confound the most obstinate with his proofs and conclusions." To such a personality all doors fly open and much is forgiven. By virtue of it access to anatomical material was doubtless easier to him than to others, and it is not difficult to believe that many an indulgence was accorded the versatile artist who persisted in pursuing studies in defiance of the sentiments of the times. That he made many dissections is proved by the work he left. Somewhere in the note-books he gives the number as ten. But de Beatis, writing of him when he was an old man living at Amboise under the protection of Francis I, says: "This gentleman has written of anatomy with such wealth of detail, illustrating by his art both limbs and muscles, nerves, veins and ligaments of the inward parts, and of all that may be demonstrated in the bodies of men and women, in a way that has never been equalled by anyone else. And this we have seen with our own eyes, and he has also told us that he has dissected more than thirty bodies of men and women of different ages."

Leonardo pushed his investigations far beyond the necessities of art; to depict beauty did not satisfy his inquiring mind; he must unravel the very secrets of her being. He sawed the bones lengthwise, to see their internal structure; he sawed the skull in various directions, and was the first to discover the cavities in its walls; he cut through the vertebræ and showed the spinal cord, the link between the brain and the nerves. His restless scalpel exposed the hidden and inaccessible parts and organs of the body. His methods of work were the technical methods of an anatomist, not those of an artist studying anatomy for the benefit of his art. He prepared the vessels for dissection by injection and used a variety of instruments. In the few anatomical sketches left by Raphael and Michael Angelo, the evidences of personal and skilful dissection, unmistakable in all of Leonardo's work, are entirely lacking. They studied anatomy as did the Greeks; Leonardo studied it as does every medical student to-day. He made his drawings of the dissections on loose leaves, on the margins of which he wrote (left-handed) explanations of the drawings, together with notes and suggestions of various kinds. He quotes Galen and Avicenna and proves Mondinus wrong; he tells how many dissections of each part are necessary for proper description, draws diagrams for mannikins arranged with strings, for a proper understanding of the action of the muscles, makes observations on various scientific and philosophical subjects.

Leonardo bequeathed his anatomical note-books to his friend Melzi, who took them with him to Milan. They later had a checkered career, some were lost and some scattered, the largest collection being that at Windsor, which has recently been reproduced in Paris and Turin.

The note-books as we find them are much the same as an anatomist, preparing a book, might draft to-day. The drawings are not arranged in order and the notes are entirely insufficient to serve as a text. But it was Leonardo's intention to write a treatise on anatomy in one hundred and twenty volumes—and the note-books were without doubt the foundation of this project. He prized illustration in everything, and the drawings were the permanent part of the work. This treatise was never finished; perhaps it was never systematically begun. "It is neither avarice nor negligence that has hindered me," he wrote, "but lack of time." So in anatomy, as in almost everything else he did, we are losers in that he did not go further. He left fewer finished works than any other great artist of the Renaissance. But the wonder is that he finished anything. He set himself the highest standards of perfection in execution. And everything he touched aroused in him a seething mass of ideas, speculations and insistent thoughts, which are too often the foes of constructive effort. The world for him was a circus with a hundred rings. He must not only see what was going on in all of them, but must know the details and the causes. He must know for hims "Who relies on authority for argument," he writes, his memory, not his reason." The dissection of the vessels of the scalp stimulated him to inquiry as to the of respiration, of the movement of the heart, of vomit of how food descends to the stomach and how it is evacuat how man swallows, why he coughs, yawns and sneezes, legs go to sleep, and what makes the sensation of tickl Any one of these problems could keep a physiologist bus a life time. But for Leonardo such questions were only of those pressing forward for answer.

Flaubert said that Michael Angelo trembled when he near marble. Leonardo must have trembled in every wak moment, for no circumstance was too trivial to stir the tric excitability of his mind. His execution could no keep pace with his idea than sound can with light. He sponded too freely to stimuli to permit of many finish products. But the high order of his mind is plain from fact that in spite of his many occupations, everything he showed the hand of the master craftsman, and every subj was enlightened by his thinking about it. Although he gained little glory from it, he was easily the first man acquire an accurate knowledge of descriptive anatomy. the history of a science the place assigned to those who stud it is determined by their influence on the development of science rather than on what they know themselves. It doubtful if Leonardo's work was familiar to many of contemporaries, and there is no evidence that his drawi ever were of use to anatomists of his day or later. A contention that Vesalius secured Leonardo's drawings changed them for his own use is too absurd to receive noti The merit which is certainly his and the respect in which is entitled to precedence over Vesalius, is that he used great talents to break down the barriers which impeded medi progress, and that he inaugurated modern methods of anato ical investigation. A mention may be found in the note-boo of a speech to be made to students, probably de la Torre's, which he urges them to greater zeal in learning from diss tion, which even the students were superstitiously afraid rather than to rely on authority. He made long-range and catapults, and devices for destroying strongholds and defending them. With the self-confidence which is a part genius, he submitted to his patrons the most pretentious pla for all military operations. Yet he hated war, calling it bestial frenzy. And I fancy that he was taking a fling at mar tial practice when, in his defense of dissection, he compar the morals of the anatomist who reveres human beauty, to morals of those who aim to destroy it. Throughout he sho the spirit of independence and inquiry, which always mean originality of thought, and in those days meant personal age as well. "Study science first," he notes, "for without practice is nothing." He urges solitude, to permit the inde pendent working of the mind. He practiced it as far as a man can. He had no country, no family, and no woman name was ever associated with his.

All his anatomical work reveals the painstaking thorough can live. His iring mind was not satisfied with description; it must compare. The bodies of men as opposed to women, the parative study of different parts (e. g., the foot) in man animals and birds, the differences of structure at different , the protective intentions of nature, as shown by the es running along the sides of the fingers, instead of on ront or back, all were studied or noted for study by him. bserved the differences in the blood vessels in youth and in age, and so foreshadowed the recognition of that disease which kills more people over fifty years of age than any other.

Had his accomplishments been less burdensome, had his genius been less universal, had he been permitted to make generally accessible to others what he knew himself, he might easily have shown himself to be as great an anatomist as Vesalius and still have had time to paint the Mona Lisa. Then the honor of founding modern anatomy would have belonged to Italy rather than to Belgium.

EMBRYOLOGY AND OBSTETRICS IN ANCIENT HEBREW LITERATURE.*

By David I. Macht, M. D.

ie origin of life, the development of the human being, irth of the babe and the growth of the child have always pied a prominent place in the literature and religions of rimitive peoples, and in none a more important one than idaism, which considers the injunction "be fruitful and iply" (Gen. I, 28) as the first commandment of the lation, and the perpetuation of the race as the sacred of mankind, and which brands as crime and moral murny interference with the normal development and growth e species from its very incipient stage to the time of its . It is therefore not surprising to find that embryology obstetrics receive more attention in the early Hebrew ngs, and more particularly in the Talmud and the Madra- , than any other medical subject.

ferences to the earliest stages of embryonic development ound as far back as the Bible. In Psalm CXXXIX, , we read:

> being was not concealed from thee, when I was made in , when I was embroidered in the lowest parts of the earth. undeveloped substance did thy eyes see; and in thy book ll of them written down—the days which have been formed, yet not one of them was here.

l in Job X, 10-12, we find the following:

> ld, like milk didst thou pour me out, and like cheese didst urdle me. With skin and flesh didst thou clothe me, and one and sinews didst thou cover me. Life and kindness hou grant me, and thy providence watched over my spirit.

general Hebrew name for the product of conception ri habbeten" or "fruit of the body." The earliest n the development of the embryo is termed "golem," borrowed from the passage in the Psalm CXXXIX ioted, and which literally translated means something less and rolled up"—an undeveloped substance. In ther development of the embryo various stages are dis- hed by the Hebrew sages and are designated by special The first stage begins with the "golem" or unde- substance and extends through a period of forty-two days or six weeks. The fœtus at the end of this period is known as "shefir merukkam," or embroidered membrane, clearly referring to the developing ovum with its membranes. The physician Samuel, in the second century (?) studied the embryo at this stage; and we are told that the eyes, nose and mouth can now be distinguished, the whole creature resembling a "grasshopper." In the Tractate Niddah 25 a, we read:

> The wise men learned, what is a "shefir merukkam"? Its eyes are like unto the two dots of a fly and are separate from each other; its two nostrils are like unto the two points of a fly but merge into each other; its mouth is fine like unto a fine hair; and its hands and feet are still unfashioned.

A second stage is distinguished from the sixth week to the fourth month. The embryo is now called an "ubbar," a passive participle, meaning literally "something borne or carried." It is the ordinary Hebrew word for a "fœtus." So is the mother spoken of as "meubbereth," or one "loaded down"—gravid, and the period of gestation is known as "yemay-ha-ibbur," or the days "of being loaded down"—of gravidity. At this stage, we are told, one can recognize the fingers and toes, the hair and the nails, and also the genitalia (Niddah 25 a). The growth of the hair is an important step in the development. We read "the work is not permanent, until the hair hath cropped out" (Niddah 25 b).

With the fourth month, we come to the third stage in the development. The fœtus is now no longer "like unto a grasshopper," but looks like a human being, and is now spoken of as "welad," a child. This "welad" or child, on reaching the seventh month, is known as "welad shel kaymo," a "viable welad," or a child that can survive. The Hebrew scholars looked upon a seventh-month baby as capable of surviving. In the eighth month, the Aristotelian notion prevailed, that the chances were not so good as in the seventh.

A fully developed fœtus is known as "ben she-kallu chaddoshow," "a child whose months have been completed."

An abortion or miscarriage is known in Hebrew as a "nefel," or something dropped.

In regard to the maturation of the ovum, the ancient Hebrews seem certainly to have recognized that for the develop-

---

l before the Johns Hopkins Hospital Historical Society r 12, 1910.

ment of the primitive germ there must be a union of male and female elements.

"Three partners," we are told, "contribute to the development of man: the father and mother, and the Holy One, blessed be His name. The father soweth the white and the mother soweth the red; God giveth spirit and life" (Niddah 31). Of the male and female elements, it is the nuclei or "kernels," as the scholars put it, that are the essential parts. (Sabin III—Midrash Rabba. 3 M. 14.)

In regard to the order of development of various parts, the general opinion was that the head first developed, then the body, and other parts; but a few maintained that the center of development is the umbilicus, evidently bearing in mind the attachment of the cord with its nutrient vessels.

The position of the fœtus is briefly thus described: "In the first three months, the child is below (that is inside the pelvis); in the second three months it is in the middle (that is between the pubis and umbilicus); and in the last three months it is at the top or at the level of the umbilicus" (Niddah 30). This served well as a rough means of determining the age of the fœtus. The position of the child inside the membranes was regarded as perfectly free, that being the function of the amniotic liquid.

"It floateth like a nut-shell on the waters, and moveth hither and thither at every touch" (Mid. R. 3 M. 14).

The child at full term is graphically described as follows, in a passage which has become classical and is often quoted by Hebrew writers:

> Rabbi Simlai lectured: the babe in its mother's womb is like unto a rolled up scroll, with folded arms it lieth closely pressed together, its elbows resting on its hips, its heels against its buttocks, its head between its knees. Its mouth is closed; its navel open. It eats its mother's food, and sips its mother's drink; but it doth not excrete for fear of hurting. Now when the time hath come, that which is closed is op'ed, and what was open closeth, behold the child is born. (Niddah 30 b.)

When we now turn to obstetrics proper, we are struck by the wealth of anatomical terms. The following is a list of the terms applied to various parts of the organs of generation:

Uterus = rechem.
Mons = kaf tappuach.
Vulva = erwah.
Rima pudendi = beth ha-sesarim (Niddah 66 b).
Vestibulum vaginæ = beth hizon (Niddah 41 b).
Orificium urethræ = lul (Niddah 17 b).
Hymen = be-thulim.
Ostium vaginæ = beth shinnayim.
Vagina = beth teref, beth rechem (Niddah 64 a).
Septum vesico-vaginale = karka prozdor.
Canalis cervicis uteri = mokor (Niddah 41 a).
Cavum uteri = cheder, beth herayon.
Fœtal membranes = shefir.
Placenta = shilyoh.
Ovary and tube = shelil shel bezim (Bezah 7 a).

The diagnosis of pregnancy was made practically by the same signs as now. The signs of pregnancy are divided into [illegible]: the positive signs and the presumptive signs. The positive signs were regarded as coming from the fœtus itself, the perception of its movements, the palpation of its parts. The chief presumptive signs were the suppression of menstruation, the appearance of colostrum, changes in the size and consistency of the uterus, and various subjective symptoms. A peculiar gait is spoken of, as characteristic of a [illegible] pregnancy. Some obscure passages in the treatise Niddah seem to refer to what may be taken as a molar pregnancy, "hydatidiform mole," and there are certainly references to what may be regarded as extra uterine pregnancies.

The signs of former pregnancies, or of labor recently gone through, are cervical and other tears, and the presence of rests of placenta or membranes.

An intact hymen, though a presumptive evidence of virginity, is not regarded as an absolute proof. Cases are described of coitus with unruptured hymen (Chagiga 15 a).

Menstruation plays such an important rôle in the ritual life of the Jews, that a separate paper could be written on the subject. Here we shall merely mention a few salient points.

The age of puberty is by Jewish law set for the male at the completion of his thirteenth year, for the female at the end of her twelfth year. In the Orient, as is well known, menstruation begins at an earlier age than in the Occident. As signs of puberty were regarded the growth of pubic and axillary hair, development of the breasts, elasticity of the mammæ, pigmentation of the areola and various changes about the genitalia.

The type of menstruation was studied especially in regard to a determination of the time of its approach. The Jew is required by law to separate himself from his wife a day before the approach of her menses, and not to approach her until after she has dipped in the ritual bath or "mikewah" seven days after their cessation. Three types of menstruation were distinguished: In the first type, the periods return at certain definite regular intervals of time; in the second type the return is not so regular as to time, but is preceded by various premonitory symptoms or signs, such as headache, pains in the abdomen, backache, heaviness in the limbs, premenstrual chills and fever, etc.; in the third type are [illegible] all the irregular cases.

Infantilism and under-development, with their consequent amenorrhœa and sterility are treated under a special heading called *Ai-lo-nith.* In connection with amenorrhœa and dysmenorrhœa I may mention their treatment by the employment of a reed or a stem, much like the stem-pessary employed by modern gynecologists not so many years ago.

The duration of normal gestation was given by the Talmudists as 271 days, or 9 months of 30 days each. There may, however, be variations, and a pregnancy of 12 months' duration is cited (Niddah 27 a and Jebamoth 80 b). As a mnemonic the length of pregnancy is expressed by the Hebrew word for pregnancy—HERAYON. In Hebrew, as in Latin, numbers are expressed by the letters of the alphabet, and the numerical value of the Hebrew word for pregnancy is 5 + 200 + 10 + 6 + 50 or 271 days.

among the ancient Hebrews than nowadays. "Ere the wife cometh in unto them they are delivered" (Exodus I, . Severe labor pains were regarded as signs of divine th and punishment, and the prophets often employ this re of speech in their utterances.

'our cases of dystocia or difficult labor are mentioned in Bible. The first is that of Rebecca giving birth to her 1s (Genesis XXV, 24). The second is that of Thamar nesis XXXVIII, 27), also giving birth to twins. The d is the birth of Benjamin (Genesis XXXV, 17) in which mother Rachel succumbed. The fourth is the case of the of Phineas (I Samuel, IV, 19) of which we read:

> nd his daughter-in-law, the wife of Phineas was with child, to be delivered; and when she heard the tidings concerning the ark of God had been taken, and that her father-in-law her husband were dead, she sank down and gave birth; for pains came suddenly upon her.

7omen in labor were attended by midwives, called "meyal-1" or birth helpers, "chachomoth" or wise woman, and ayoth" or life bringers. Physicians assisting in confine-it are not mentioned in the Bible but are referred to in Talmud.

'he birth took place on a special kind of couch or stool—"mashber." The midwife delivered the child and cut cord, bathed the infant (Ezekiel XVI, 4), rubbed it with and wrapped it in swaddling clothes (Job XXXVIII, 91). a case of asphyxiation the Talmudists recommend strok-the cord gently towards the infant before cutting it, and xtreme cases trying resuscitation by direct inflation of the nt's lungs (Sabbath, 130 and 150).

[ultiple pregnancies are frequently mentioned. Twins common, and in Egypt we are told the Hebrew women birth to sextuplets (Midrash Shemoth, and Rashi Exodus).

uperfecundation and superfœtation are both mentioned in Talmud and are of medico-legal importance. The Tal-ists held that a superfecundation occurring within forty after the first conception may lead to normal twins; 'eas after forty days one of the twins will thrive at the ase of the other. After the third month superfecundation ot take place. We read (Berachoth, 60): "From the day until after the 3rd month, one shall pray that there no 'sandol' (fœtus papyraceous or compressus); that nay not conceive a second child and so interfere with evelopment of the first."

th reference to superfœtation the law prohibits the mar-of a widow or a divorced woman who is pregnant until the birth of the child (Jebamoth, 36 b-42 a; Sota, 26 a). word or two as to malformations and monstrosities. a number of malformations and monstrosities are men-in the Talmud. We read of a fœtus with a human nd animal body, of a monster with a single eye, of an los, of various malformations of the head, of partial ion of viscera, etc. Of special importance are various forms of hermaphrodites. These give rise to legal complications in cases where certain duties are limited to one sex only. A separate chapter in the Mishna under the title Androgynes is devoted to this subject.

Finally, a word in regard to obstetrical operations. Three kinds of operations are mentioned in the Talmud. The first was a destructive one—embryotomy, which consisted in the cutting up of the dead fœtus and extracting it piecemeal. The other two aimed at the saving of both mother and child. One was called "kariyath habbeten" or the cutting open of the abdomen, and was nothing more or less than the classical Caesarian section. The other operation called "yozay dofan" or delivery through the side, also aimed at the saving of both mother and child, but its exact character is a matter of dispute among Hebrew archæologists.

Before concluding, a word as to the Hebrew ideas on heredity and the recently much agitated so-called new but really old subject of eugenics. Freedom of will is, of course, the foundation of the Jewish as well as of all religions. "All is in the hands of God, except the fear of God," is a famous Hebrew saying. Man makes himself! And yet, the Hebrew sages recognize too well the importance of heredity. The sins of the parents are but too often visited on their children and their children's children unto the third and fourth generation, and that both morally and physically, hence a well-known Talmudic saying (Baba Mezia, 75 a): "Seest thou a wise man, whose son is wise, and whose son's sons have been brought up in the ways of wisdom—from their house wisdom shall not depart."

And that is indeed the natural explanation of the numerous Hebrew laws and customs pertaining to marriage and marital relations. The Jewish law does not shrink from the problems of social hygiene, but takes them up and analyzes and discusses them with exactly the same minuteness and exactness as the laws pertaining to the observance of the Sabbath and holidays, the dietary laws, the agrarian laws, the laws pertaining to the giving of charity. The body is not the sordid instrument of sin to be curbed and subjected, stunted and worn out by penitence and castigation; nay, it is the sacred abode of the spirit, and all its normal physiological functions are regarded as wholesome and intended for good. So is the procreative faculty, when subserving its true purpose—the rearing of a sturdy race of servitors to God. With such an end in view it is a sacred duty.

The Torah or the law thus frees us from the fetters of materialism, yet guards against the barrenness of an ascetic life, and consecrating all our activities to an exalted, noble end, uplifts mankind above mere dust. The ordinances concerning menstruation, the rigid laws enjoining periodic separation and purification in married life have all this end in view—to use the means, only as means, not for themselves, but for the furtherance of higher, nobler ends. No wonder, then, one ancient Hebrew sage styles them as ordinances of such momentous, far-reaching importance, compared with which astronomy and geometry are only "after-courses" in the School of Wisdom.

What the results of such a conduct are is not for me here to proclaim.

That, history has shown; that, history still shows; and that, so long as Jew is loyal to his heritage, history will continue to demonstrate.

Kislev, 5671.
December, 1910.

LITERATURE.

1. Jewish Encyclopedia.
2. Hamburger: Real-Enzyklopedie des Judentums.
3. Talmud-Babylonian. Ed. Wilna.
4. Midrash Rabba.
5. Joseph Bergel: Die Medizin der Talmudisten. Leipzig, 18
6. A. H. Israels: Tentamen Medico Historicum Gynecologic 1895.
7. R. J. Wunderbar: Biblisch Talmudische Medizin, 1850-18

ON DISSEMINATED CASEATING TUBERCULOSIS OF THE LIVER.

By William Sydney Thayer, M. D.,
Associate Physician, The Johns Hopkins Hospital, Baltimore.

Focal tuberculosis of the liver is a condition rarely giving rise to recognizable clinical phenomena. Those instances which are detected during life are, for the most part, large, solitary, conglomerate tubercles or tubercular abscesses. Disseminated caseating tuberculosis, while not uncommon, especially in children with intestinal and mesenteric lesions, is not often recognized *intra vitam.*

Rolleston[1] says: "There are very seldom any definite symptoms pointing to the liver."

Brown[2] says: "Complications of the liver have more pathological than clinical importance."

Hale-White[3] describes the condition purely from an anatomical standpoint and says: "This form of tubercular disease does not give rise to any clinical symptoms, as there is no damage to a sufficient number of ducts to cause jaundice."

Ebstein[4] says: "But also in these very rare cases (large conglomerate tubercles), tuberculosis of the liver has a purely anatomical interest."

The recent observation by the writer of an instance of tuberculosis of the liver where, during life, the hepatic changes stood in the foreground of the clinical picture would seem to justify a brief note.

M. B. (Med. No. 22216), a colored woman of 49, was admitted to the hospital on February 11, 1908, complaining of pain in the right lumbar region and in the back. Her family history was unimportant, excepting that her husband had died of tuberculosis 26 years ago. She had had measles in childhood; had been married 28 years: had had two children, one of whom died of tuberculosis. In July, 1902, a hystero-myomectomy was performed for sub-mucous myoma of the uterus, tubo-ovarian abscess and follicular salpingitis.

About five years ago, she had begun to suffer from rather ill-described pain in the left side which had continued. She had had a slight cough with occasional blood-streaked expectoration and increasing dyspnœa on exertion; night sweats for two years, constipation. About two months ago, *there was slight jaundice of the conjunctivæ, lasting about a week.*

On physical examination the thorax was clear, except for a few scattered sibilant râles. The abdomen was full and on bimanual palpation there was an indefinite sense of fluctua in the right flank, although the percussion note was tympani even in the flanks. The border of the liver was not palpable.

Blood count:

R. B. C.	4,136,000
W. B. C.	6,120
Hb.	49%

Differential count:

Small mononuclears	7%
Large mononuclears	3
Transitionals	0.5
Polymorphonuclear neutrophiles	87
Polymorphonuclear eosinophiles	0.5
Unclassified	1

Stool: semi-fluid, light yellowish-brown. On standing, upper third was fluid, the lower two-thirds, a brown and granula material. No parasites or eggs in the sediment; few cholester crystals.

The urine was increased in quantity and contained a trace albumin and a good deal of pus and, considering the resistan in the right flank, it was thought well to catheterize the ureter The patient, however, refused. An X-ray plate of the right si was taken which was broken in developing. By this time, suspicion that the resistance in the right side might depend up a renal mass having passed away, no further X-ray examinatio was made.

The temperature during the patient's stay in the hospital wa irregular, ranging from normal or a point slightly sub-norma often to 103° F., sometimes to a point above this. It was ge erally of an hectic character.

The urine continued increased in quantity, the specific gravi ranging from 1.002 to 1.010. Albumin was sometimes absent but often present in a slight trace, and occasional hyaline an granular casts were found in the sediment.

The blood pressure ranged from 120 to 158 mm. Hg. while th patient was in bed and resting.

March 22. Blood count:

R. B. C.	3,636,000
W. B. C.	6,420
Hb.	70%

March 29. Blood count:

R. B. C.	3,776,000
W. B. C.	6,840
Hb.	63%

On April 1, the author noted that the abdomen was held so rigidly that palpation was difficult. There was, however, a di adenitic mass.

---

[1] Diseases of the Liver, etc., Phila., N. Y., London, 8°, 1905, 342.

[2] Osler's Modern Medicine, Vol. III, p. 320.

[3] Allbutt's and Rolleston's System of Medicine, Vol. IV, Pt. I, p. 199.

[4] Ebstein-Schwalbe. Handbuch der praktischen Medizin, 2 Aufl., Stuttg., 1905. B [illegible]

The patient was discharged at her own request, on April 4, 908, with a diagnosis of chronic nephritis and possibly tuberulous peritonitis. The fever still continued.

She returned to the hospital on August 10, 1908 (Med. No. 22989). On this occasion, she had complained for about a month of swelling of the legs, feet, and abdomen, of tenderness in the right upper abdominal quadrant, and of fever and night sweats. There had been a slight cough, but little expectoration; there vas constipation. There was slight puffiness of the eyelids, and moderate œdema of the ankles and legs. Slight enlargenent of posterior cervical, axillary, epitrochlear and inguinal glands. The lungs showed a few crackling râles at both bases. The abdomen was full, measuring 88 cm. in the umbilical line. t was tender on palpation and had rather a doughy feel; evident novable dulness.

On August 29, Dr. Futcher observed that the liver was distinctly felt 10 cm. below the costal margin in the mamillary line and 8.5 m. below the xyphoid; 3 cm. above the umbilicus in the median ine. There was no special abdominal tenderness and no masses vere to be felt. There appeared to be slight impairment on perussion at the right apex with harsh breath sounds and a few nedium moist râles at the end of inspiration. The temperature vas irregularly continuous and remittent.

The urine was of rather low specific gravity and showed a race of albumen and hyaline and granular casts. The diagnosis n this occasion was again "Chronic nephritis; tuberculous peritonitis (?); enteroptosis."

The patient returned again on March 12, 1909 (Med. No. 3828). According to her statement, she had remained in fairly ood condition until about four or five weeks before admission hen she began to complain of diarrhœa, weakness and loss of ppetite. There had been a little blood and mucus in the stools d later, some loss of control over the sphincter. There had en no abdominal pain; no cough; no shortness of breath. Two onths before she had been troubled for a time by sweating at ght. On entrance the temperature was normal but soon rose, maining irregular and remittent while she was in the hospital, ranging from 99° to 102° F. On physical examination, she was moderately well nourished, but had obviously lost considerable weight. There was slight dulness at both bases with numerous moist crackling râles. The heart was in no way remarkable. The abdomen dome shaped, much distended. The edge of the liver was seen to descend with inspiration, and the edge firm and irregular, was easily felt to the right of the median line. The surface of the liver felt rough though no large masses were to be felt. The flatness extended from the 5th rib to a point 11 cm. below the costal margin in the right mammillary line and 12 cm. below the tip of the xyphoid process. Dulness on the left side shifted with position.

Blood count:

R. B. C.	3,444,000
W. B. C.	4,600
Hb.	63%

The stools, repeatedly examined, were semi-solid and fluid, showing a certain amount of mucus, evidences of occult blood and occasionally a few red corpuscles. Microscopically, there was no excessive amount of fat; no amœbæ were found on careful examination.

The blood pressure was rather low—95 to 120 mm. Hg.

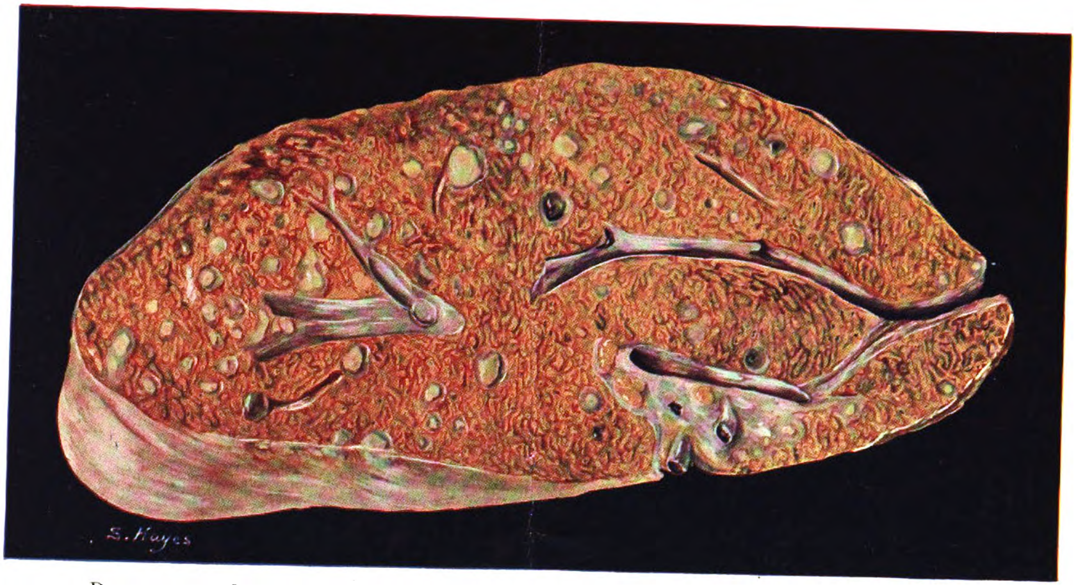
The leucocytes were normal in number, even sub-normal, 4500, on the day before death.

An Ewald test meal showed 100 cc. of thin watery fluid which separated into two layers, the upper consisting of a turbid, dirty yellow liquid and the lower of finely-divided food elements. It was acid; total acidity, 18; free hydrochloric acid, absent; lactic acid, absent; test for occult blood, negative. Microscopically, fat droplets were present in considerable numbers; starch granules, epithelial cells and vegetable fibres.

The Wassermann reaction was negative.

The urine apparently rather reduced in quantity, showed a specific gravity of 1.011, a heavy ring of albumen, and numerous hyaline, finely and coarsely granular casts.

On the 18th of March, the writer noted that both apices showed a slight tubular modification of the respiratory murmur, and fine crackling râles were detected, especially above the left clavicle,



Disseminated Caseating Tuberculosis of the Liver, with Cavity Formation, in an Adult.

as well as a peculiar superficial crackle, which sounded almost pleural in character over the whole left chest. There was little modification on percussion of the bases behind. Numerous fine râles were to be heard at the apices and occasional crackles throughout both backs. Abdomen, large and full. Flanks bulged. The umbilicus protruded. Diastasis of recti. Respiratory movements free. Edge of liver sharp, firm and smooth, but not quite so sharp in the right flank as elsewhere. Upper limit of liver flatness, 6th space in mammillary line. Lower border, 10 cm. below the costal margin in the mammillary line, 9 cm. below xyphoid; notch, well felt. No fluctuation detected.

March 21. The patient had been growing progressively weaker and for three days, the posterior parts of both lungs had been filled with fine, moist râles although there had been no dulness. The heart has been markedly irregular at times. There appeared to be no fluid in the abdominal cavity.

The patient became gradually weaker, the anæmia, more marked.

Blood count:

R. B. C.	3,000,000
Hb.	50%

Numerous fine râles appeared throughout the chest. At 8.30 p. m., she died.

In *summary*, then, the history is that of a colored woman of 49, who, a little over a year before her death, came to the hospital suffering from remittent and intermittent fever and vague abdominal manifestations—tenderness, resistance. Six months later, she returned with a history of diarrhœa of four or five weeks' duration; weakness and general debility. There was irregular fever with morning remissions or intermissions. The liver, which was somewhat prolapsed, was much enlarged and firm and there was a well-marked anæmia of a secondary type. There was, at times, occult blood in the stools which showed considerable mucus. No excess of fat or fatty acids.

The diagnosis of tuberculous peritonitis, made on her previous entry, seemed reasonable when one considered the race of the patient, the fever, and the general abdominal symptoms, the diarrhœa suggesting a tuberculous enteritis, but the hepatic enlargement seemed difficult to account for on the basis of tuberculosis, although the possibility of a fatty cirrhotic liver was considered.

Considering the age of the patient, the degree of anæmia, the progressive enlargement of the liver, its firmness and slight irregularity, one could not but think of the possibility of a neoplasm of uncertain origin. The well known occurrence of fever in association with hepatic neoplasms would not have been against this diagnosis, although no suggestion as to the primary seat of such a growth could be found beyond the possible significance of blood and mucus in the stools.

Another possibility which suggested itself was that the case might be one of amœbic abscess of the liver. The slight fever, the diarrhœa, the jaundice present at one time, although amœbæ had not been found in the stools, and the progressive hepatic enlargement formed a clinical picture not unlike that which is occasionally seen in such cases.

The necropsy was performed on March 22 by Dr. Winternitz (No. 3188).

(Abstract.) Anatomical diagnosis: *Tuberculosis of the mesenteric and retroperitoneal lymph glands with involvement of the receptaculum chyli; chronic adhesive peritonitis; chyliform ascites; tuberculosis of the spine with abscess formation; generalized tuberculosis; extensive tuberculosis of the liver with cavity formation; tuberculosis of the spleen and liver; tuberculous broncho-pneumonia, caseous and gelatinous; fatty degeneration of the liver; chronic fibrous pleurisy; chronic diffuse nephritis; arterio-sclerosis; chronic fibrous myocarditis; thrombosis of ovarian vein.*

The peritoneal cavity contained a considerable amount of chyliform fluid which was extremely milky in appearance. The omentum was definitely plastered to the parietal peritoneum but was not evenly adherent, so that encapsulated areas appeared in which the above-described fluid was found. The intestinal peritoneum was not adherent either to the omentum or to the parietal peritoneum of the anterior surface, so that when the omentum was severed from its attachment, the abdominal contents were easily exposed and the intestines were found to lie almost entirely in the lower half of the abdominal cavity. A large mass was found in the upper portion of the abdominal cavity filling the entire epigastrium and the upper half of the umbilical region as well as the hypogastric region on the right side. This mass which proved to be the liver, was covered over its entire surface by adhesions which were formed by fibrous œdematous union between the peritoneal surface of the organ and the parietal peritoneum. The liver was closely bound to the diaphragm above on both right and left sides. The stomach was bound down by dense adhesions. The mesenteric lymph glands were extremely large and yellowish-grey. On section, they were rather firm and mottled, the greater part of their structure being composed of a rather friable yellowish substance which had a faint green tinge, while throughout one could see other areas which were slightly more translucent and depressed.

There was nothing remarkable in the heart.

The lungs showed a disseminated tuberculosis with larger areas of broncho-pneumonia here and there.

The spleen measured 10 x 6½ x 4½ cm. The capsule was everywhere adherent to the diaphragm and surrounding viscera. On section, the Malpighian corpuscles were indistinct, and smaller opaque yellow tubercles were to be made out.

The stomach, duodenum and pancreas showed nothing of importance.

The liver was considerably enlarged, measuring 30 x 28 x 10 cm. It was flabby, and the surface was covered with nodules varying from 0.5 to 1 cm. in diameter, which were yellowish-grey. On section, the liver was everywhere studded with these nodules, some of which were firm and yellow and caseous; many were, however, cavities showing greenish bile deposits in their centres. Many of these caseous masses were surrounded by thin, translucent, reddish-gray capsules. The remainder of the liver was pale. Lobulation was indistinct. The tissue about the hepatic vein was reddened and the peri-portal veins were everywhere very visible. Small tubercles were also scattered throughout the liver tissue, many surrounded by transparent gelatinous zones.

Kidneys: The right measured 11 x 6½ x 3½ cm. The capsule stripped off with slight difficulty, leaving a rather smooth, pale surface. On section, the kidney was everywhere studded with yellow nodules which, in some spots, were as large as 1 cm. in diameter. Most of these were small, measuring 2 mm. The cortex of the kidney was swollen, averaging 7 mm. The striations for the most part were regular and the parenchyma was extremely pale, showing here and there yellow irregular areas more opaque than the surrounding. The glomeruli were prominent and transparent, pale pink in appearance. The left kidney resembled the right in every respect.

The thoracic duct, which was dissected out carefully, was found to be in communication with a mass of glands which lay in the region of the receptaculum chyli.

glands lying over the spine on the right side from the eighth dorsal to the first and second lumbar, were soft and a puriform fluid escaped from them. There was tuberculous caries of all the vertebræ from the sixth thoracic to the first lumbar. There was no essential curvature of the spine.

Examination of the ascitic fluid showed that, after standing for several hours, it had become more milky in appearance. Specific gravity 1.018. Microscopically, there were large numbers of degenerated peritoneal epithelial cells. In addition, a few small round cells and some fat globules were seen. No tubercle bacilli were found.

The liver, microscopically, showed many large areas of caseation, some involving bile ducts the remains of which could be seen in the necrotic ulcerated centre. The remaining liver tissue showed an extensive fatty degeneration. Around some of the larger tubercles, there was a zone of tuberculous granulation tissue which was rather fibrous showing here and there well-formed tubercles. This doubtless represented the translucent grayish zone which was observed about the large tubercles in gross. There was no definite cirrhosis throughout the remaining portion of the liver, but one found here and there small patches of cellular tissue which were possibly healing tubercles. In these one found no areas of degeneration but a mass of rather well-preserved spindle cells and round cells. Among these numerous blood vessels might be seen. Some of these were evidently the tips of well-formed tubercles. Others of the larger tubercles showed a dense mass of fibrous tissue surrounding a caseous centre. The fibrous tissue, however, was not well preserved and had apparently undergone hyaline degeneration. Tubercles, however, in these areas, were definitely circumscribed and were apparently old processes that are walled off. In other areas, masses of miliary and conglomerate tubercles were to be seen which seemed to proliferate irrespectively of any general position. These did not involve the bile ducts and were not in close relation to any particular portion of the vascular system.

The kidneys showed here and there dense bands of fibrous tissue extending in from the capsule. Here the renal tissue had undergone definite atrophy, the tubules being very much smaller than in the surrounding tissue. Glomeruli might be found in this mass as dense hyaline staining masses. In fact, the glomeruli seemed to show most marked changes. One found in many places, where he uriniferous tubules were apparently not markedly degenerated, that the glomeruli were large, filling up, as a rule, the entire capsule. In some places, there was a slight exudate etween the glomerular capsule and the tuft, but this was not ften found. There were not very many intermediate stages beween glomeruli which appeared normal and those in which there was a dense fibrosis. Where these were to be seen, the thickening eemed to start in the glomerular capsule which proliferated at he expense of the glomerular tuft. The uriniferous tubules hroughout stained diffusely red. Their lumina were dilated nd contained serous-like material and many casts. Many of the pithelial cells of the tubules showed large vacuoles which filled he entire cells, and smaller vacuoles might be seen near the asement membrane, but not as large as those which have been escribed. In some places the entire tubules showed this acuolar degeneration.

To summarize then, we have before us the history of a lored woman, 49 years of age, with a record of rather in-finite abdominal pain of a year's duration and almost con-nuous remittent or intermittent fever of a moderate degree, th sweating at night and progressive emaciation. Examination of the thorax showed little beyond the appearance toward the end, of rather diffuse fine râles throughout the lungs. During the last eight months of the patient's life there was a steady enlargement of the liver which finally extended to a point 10 cm. below the costal margin in the right mammillary line. It was somewhat tender and very firm, and, on one occasion, slight irregularities of surface were noted. The border which was distinct, seemed a little blunter in the right mammillary line. There was considerable anæmia of a secondary type, but without leucocytosis, a persistent albuminuria and cylindruria without polyuria but with a rather low specific gravity, and, in the end, diarrhœa with mucus and occult blood in the stools.

The progressively enlarging liver, the age of the patient, the anæmia, the fever which after all, is common in hepatic neoplasms, all led us to lean toward this as a possible diagnosis, despite the fact that beyond the diarrhœa with occult blood in the stools no suggestion as to the seat of a primary lesion was to be made out.

The indefinite abdominal pain, tenderness and fever, together with the diarrhœa occurring in a colored woman were strongly suggestive of peritoneal tuberculosis, despite the absence of definite pulmonary signs, but the progressively and apparently great enlargement of the liver did not appear to us to depend upon tuberculosis alone. It was thought that a rolled-up omentum might be adherent to the liver, thus increasing its apparent size, but the sharp border of the liver was against this.

A steadily enlarging liver, with persistent, slight fever, even in the absence of leucocytosis, is by no means unusual in amœbic abscess which occurred to us as a possibility.

Syphilis was ruled out by the absence of a Wassermann reaction and by the fact that anti-luetic treatment had been without result.

The case was, indeed, presented to the class with the main possibilities as to diagnosis set forth in the order named: hepatic neoplasm; amœbic abscess of the liver; peritoneal and intestinal tuberculosis with a rolled-up omentum adherent to the liver in such a manner as to exaggerate its apparent size.

The anatomical appearances, well illustrated in the plate, are rather remarkable in their extent. A disseminated caseating tuberculosis of this degree in the liver of an adult is most unusual. But the feature of the case which is of special importance is that such disseminated caseous tuberculosis of the liver should have given rise to a tumor sufficient to constitute the central figure in the clinical picture.

It is also important to note that for a week at least during the course of this case there was jaundice—a rare manifestation in hepatic tuberculosis.

In conclusion then, it may be emphasized that disseminated caseating tuberculosis of the liver in an adult may be associated clinically on the one hand with appreciable jaundice and on the other with hepatic enlargement sufficient to form the most striking feature of the clinical picture.

A PEPTID-SPLITTING FERMENT IN THE SALIVA.

By Louis M. Warfield, A. B., M. D.

(From the Laboratory of the Milwaukee County Hospital.)

While experimenting with the glycyltryptophan test described by Neubauer and Fischer, some very inconstant results were found which led to the trial of saliva in the hope that an explanation might be found.

The presence of a peptid-splitting enzyme in cancer tissue from the stomach had already been shown by Emerson. He demonstrated its presence by taking macerated cancer tissue, dividing it into two portions, one of which was heated to 80° C. In the unheated portion the digestion of albuminous substances was carried beyond the albumose stage.

In 1909 Neubauer and Fischer utilized this property of cancerous tissue to perfect a test which they thought was of value in the diagnosis of cancer of the stomach. They called attention to four sources of error:

1. Presence of tryptophan in the stomach contents.
2. Presence of peptid-splitting bacteria.
3. Presence of trypsin (pancreatic juice).
4. Presence of blood.

They also affirmed that an HCl content of over 0.36 per cent vitiated the test. They concluded that "1. In the contents of a carcinomatous stomach there is present a ferment which with pepsin splits glycyltryptophan. 2. This ferment is destroyed by an acidity of 0.36 per cent HCl. 3. The presence of this ferment can be used for purposes of diagnosis."

The test is said to depend upon the presence in the carcinomatous tissue in the stomach of a peptid-splitting enzyme which carries protein digestion of peptids to the amino-acid stage. Neubauer and Fischer used the di-peptid glycyltryptophan, a combination of glycocoll and tryptophan. The tryptophan when split off can be readily recognized by a specific color reaction with bromine vapor or bromine water.

Normally pepsin digestion in the stomach is not carried beyond the stage of albumoses and peptones. When the chyme is acted on by the trypsin of the pancreatic secretion, there is further hydrolysis of the peptones into the amino-acids. In the complete digestion of coagulable proteins the stages are: proteins, meta-proteins (commonly called albumoses), proteoses (albumoses), peptones, polypeptids, amino-acids. We are concerned only with the polypeptids. These substances were discovered by Emil Fischer. He succeeded in linking together the amino-acids, the generic formula of which is $R—CH—NH_2—COOH$, with one another. This combination takes place between the carboxyl group of one amino-acid and the amido group of the other with the loss of one molecule of water. The most complex polypeptid yet produced is one containing 15 glycocoll and 3 leucine residues. The name polypeptid is applied to all the group of combined amino-acids. These large molecule peptids are much like the albumoses and peptones in that they do not crystallize, are precipitated by ammonium and zinc sulphate, and give the biuret test.

Tryptophan is indol-*a*-amino-propionic acid, which in combination with glycocoll forms the di-peptid glycyltryptophan. When this is acted upon by a ferment which is able to split the peptid, it is decomposed into the two amino-acids.

H. Fischer showed that in the normal stomach pepsin splits albumin into peptid chains which react alkaline to litmus. These combine every one with one molecule of HCl, and then react acid to litmus. Normal peptic digestion ceases at this stage. He also found that in stomachs in which there was cancer this chain is broken probably by a ferment. The free HCl vanishes but the total acidity may rise. This is due to the power of the amino-acids to bind the free HCl.

Lyle and Kober studied 21 cases with the glycyltryptophan test.* They conclude that "Results with the test have been satisfactory. A repeated negative reaction is very valuable. When the test is positive the complication of a regurgitation of trypsin must be thoroughly investigated. No deductions ought to be drawn from less than three tests."

Weinstein worked with the test and suggested some modifications. He disagrees with Neubauer and Fischer that when tryptophan is in the fresh contents the specimen should be rejected. He believes that the presence of tryptophan in the recent contents shows the presence of the peptid-splitting enzyme and the glycyltryptophan test is then superfluous. With this I agree. He also thinks that the danger from peptid-splitting bacteria is exaggerated as well as the danger from occult blood. It is difficult to test for bile in the gastric contents. He agrees that a specimen containing macroscopic bile should be discarded. The danger is, of course, that there may be duodenal contents containing trypsin. This is to be guarded against. He prefers bromine water to bromine vapor.

---

* The test is performed as follows: Ten cubic centimeters of the filtered gastric contents free from bile, removed from forty-five minutes to an hour after an Ewald test breakfast, are placed in a vial with 2 cc. of glycyltryptophan in solution over which is a layer of toluol. This is placed in the thermostat for several hours. Two to 3 cc. are then taken out with a pipette, transferred to a test-tube, acidified with a few drops of 3 per cent acetic acid, and fumes of bromine or a small drop of bromine water added. Care must be taken to pour only a small amount of bromine fumes or to add only a small drop of bromine water. The presence of tryptophan is shown by a rose or reddish violet color. The further addition of bromine vapor or water will, in excess, produce a yellow color. Unless the bromine is added carefully, a little at a time, one might miss a very slight pink reaction. It is also well to allow the tube to stand several minutes, as a very faint reaction often becomes more pronounced on standing.

I have procured the substance from Arthur H. Thomas Company, Philadelphia, Pa. It is expensive, six dollars for one dozen tests. One can now obtain it in bottles containing material enough for twenty-five or fifty tests.

prefers a meal of bread, butter, beef and sweetened tea which he removes after 3 to 4 hours and tests directly for tryptophan. If tryptophan is negative he places the filtered contents in the thermostat and tests again after 24 hours. From his work (150 tests) on 63 cases suffering from cancer of the stomach, and other diseases of the stomach, he concludes that the tryptophan test is a valuable sign in the diagnosis of cancer of the stomach. It is a sign in itself. The negative reaction is of more value than the positive. The results are inconstant, he admits. Whether or not it is an early sign of cancer he does not know.

Kuttner and Pulvemacher used silk peptone in their work. It is very much cheaper than glycyltryptophan, and comparative results showed that the tests paralleled each other accurately. The reaction with the silk peptone depends upon the splitting of the substance by the hypothetical cancer ferment into amino-acids, chiefly tyrosin. This is recognized microscopically. Their process is tedious and doubtless will never be used to any great extent in the clinical laboratory. It is academically of interest. They made 163 tests on 92 persons with and without stomach disease. Seven gave definite results, 19 gave variable findings. Vomitus was examined in five cases. Their results were so variable they conclude that the presence of the reaction has no meaning for the diagnosis of cancer of the stomach. For example, in 14 cases clinically cancer of the stomach, the contents reacted five times positively and nine times negatively. In 25 examinations of material removed from the fasting stomach 13 were positive and 12 negative. They call particular attention to the regurgitation of pancreas secretion and the confusion of this with the peptid-splitting enzyme. They think that the test may be of use in the demonstration of the functioning power f the pancreas, particularly after the ingestion of oil.

Personal Observations.

The first case in which I tried the test with stomach contents and glycyltryptophan reacted positively on two occasions. here was no free HCl in the stomach contents, no evidences f bile. The clinical diagnosis was acute endocarditis. At utopsy the stomach, œsophagus and intestines were abso- itely free from tumor. It was thought that in both the tests e influence of pancreatic secretion could be excluded, so my liva was placed with the glycyltryptophan in the hope that me light might be thrown on the positive tests in a normal omach. It was a great surprise to find that the saliva split e glycyltryptophan; the test was absolutely positive. No ch action of the saliva could be found in literature. Only o enzymes have been described in saliva, ptyalin and maltase. ext my assistant's (C. M. J.) saliva was tested. It reacted gatively. With three separate lots of the test material, pro- red at different times, my saliva reacted positively. The ction to litmus is definitely alkaline. Moreover, it was nd that by dividing a specimen of my saliva, which had n well centrifugalized, into two parts, after heating one rt to 100° C. and not heating the other, the heated portion did not split the glycyltryptophan, while the unheated portion gave a positive reaction. A control with distilled water performed at the same time was negative. How was the negative test with C. M. J.'s saliva to be accounted for? It was found that her saliva was acid to litmus.

It was thought that saliva from one who smokes might account for the positive test. This was shown to be false by the fact that the saliva of my assistant (R. T. G.) who never uses tobacco, gave also a definite positive result. The salivas of the six internes were then tested. Three are smokers, three never use tobacco. All reacted positively and all salivas were alkaline to litmus. Next the salivas of six nurses were tested. These were alkaline and these reacted positively.

The stomach contents of a patient, J. C. (Hosp. No. 8971), who has carcinoma of the stomach, in which there was no free HCl, but total acidity of 52, reacted negatively both to tryptophan in the fresh contents and with the glycyltryptophan on December 31, 1910. Again, on January 13, there was no tryptophan found in the fresh contents. On January 27, with no free HCl and a total acidity of 46, there was a most marked reaction to tryptophan. This was again found on March 3. This patient's saliva did not split glycyltryptophan, but the saliva of another carcinoma case (Hosp. No. 9098), in whose contents there was no free HCl, did split the di-peptid. It was found that the saliva of J. C. was acid, while that of S. was alkaline.

Tests made with stomach contents from a variety of diseases, and from R. T. G.'s and mine after an Ewald test breakfast, showed that when free HCl was present in amount from 0.05 per cent on, the glycyltryptophan was not split. On the contrary, of eleven cases containing no free HCl in the stomach contents all reacted positively but two. Both the negative tests occurred with contents which contained considerable lactic acid. One case (Hosp. No. 8588) was at first thought to be cancer of the stomach, but later was found to be chronic nephritis and arteriosclerosis; the other was J. C., who had acid saliva and total acidity of 52.

One patient, J. S. (Hosp. No. 9140), in whose contents there was no free HCl, gave negative tryptophan and positive glycyltryptophan reactions. Autopsy revealed no stomach tumor of any kind.

Another patient, J. K. (Hosp. No. 8753), with clinical diagnosis of cancer of the stomach, had alkaline stomach contents in which was no tryptophan but which split glycyltryptophan, giving a very positive reaction.

A case furnished by a colleague was rather curious. J. P. B., aged 51, was suspected of having a cancer of the stomach. There was constant absence of free HCl and low total acidity. At the Johns Hopkins Hospital two positive glycyltryptophan tests were obtained, and on these, together with his suspicious symptoms, a laparotomy was advised. In Milwaukee about one month later two tests were negative, but the free HCl was still absent. At operation no evidence of cancer was found. A few enlarged glands which were removed showed only irritative hypertrophy. The saliva in this case has not been tested.

Discussion of Results.

All who have worked with the test have reported most inconstant and variable results. The test has been found positive in achylia gastrica. This accords with the view here held that it is the swallowed saliva which is responsible for the splitting of the glycyltryptophan. This explains most of the discordant results. An occasional acid saliva would explain an occasional negative test, when it would otherwise be expected to be positive. An examination of the results invariably shows that when the stomach contents are acid, 0.05 per cent plus, the test is negative; when there is no free HCl it may or may not be positive. A high total acidity, combined HCl, as is here shown, accounts for some of the negative results, and the presence of relatively large amounts of lactic acid accounts for some other negative results. Still other negative results in contents showing no free HCl and a low total acidity are accounted for by the acidity of the saliva.

That there is a peptid-splitting enzyme in cancer juice seems to have been shown (Emerson, Neubauer and Fischer). The very fact, however, that cancer of the stomach is so often accompanied by absence of free HCl in the stomach contents is just the condition most favorable for the action of the salivary peptid-splitting enzyme.

From what glands, parotid or sub-maxillary and sublingual, this enzyme is secreted is not at present determined. Whether the splitting is caused by bacteria in the saliva has not been shown yet. Weinstein denies the possibility of bacterial action, and Neubauer and Fischer did not show positively that bacteria could split polypeptids, except after prolonged action for days. At just what temperature the enzyme in the saliva is destroyed has not been accurately determined. Heated to 100° C. it is destroyed.

Care was always taken to centrifugalize the saliva, but it did not appear that this precaution was necessary. Further work is now in progress, but enough has been done to warrant the following conclusions:

1. There is a substance in the saliva, probably an enzyme, which has the power to split glycyltryptophan.
2. This property of the saliva is lost when the saliva is acid or when it is heated to 100° C.
3. Stomach contents containing no free HCl may split glycyltryptophan.
4. Stomach contents which have a high combined acidity or which contain a relatively large amount of lactic acid fail to split the di-peptid.
5. In view of these facts the glycyltryptophan test is of no value in the diagnosis of cancer of the stomach.

REFERENCES.

Emerson, C. P.: Deutsches Arch. f. klin. Med., 1902, LXII, 415.

Fischer, Emil: Ber. d. deutschen chem. Gesellsch., XXXIV. 2864.

Fischer, H.: Deutsches Arch. f. klin. Med., 1908, XCIII, 99.

Neubauer and Fischer: Ibid., 1909, XCVII, 499.

Lyle and Kober: N. York M. J., 1910, 1151.

Weinstein, J. W.: J. Am. M. Ass., 1910, LV, 1085.

Kuttner and Pulvemacher: Berl. klin. Wchnschr., 1910, XLVII, 2057.

THE RELATIONSHIP BETWEEN THE NORMAL AND PATHOLOGICAL THYROID GLAND OF FISH.

By J. F. Gudernatsch.

(From the Department of Anatomy, Cornell University Medical College, New York City.)

Recent investigations of the thyroid gland of Teleosts have revealed a great many facts that may be of value to the comparative pathologist. The thyroid gland of these fish attracts at present a good deal of attention in cancer research, since it is often liable to cancerous degeneration, especially in artificially reared trout and salmon.

The normal anatomy of the gland was briefly described in a paper read before the meeting of the American Association of Cancer Research, November 27, 1909.* It was especially emphasized that one of the most striking features of the thyroid in bony fish is the absence of a connective tissue capsule, such as exists in other vertebrates. Later this fact was again pointed out by Marine and Lenhart. It will readily be seen that the absence of a capsule makes it rather difficult to define the normal extension of the gland. It would perhaps be better not to use the term "thyroid gland" at all in this group of animals, since physiologically isopotent units (follicles) are not so arranged as to form a closed organ, but are distributed over a wide area (Fig. 2 and Plate 1). This distribution varies not only with the species, but also with the individual, and is dependent entirely on mechanical influences, mainly pressure from the sides of the surrounding tissues.

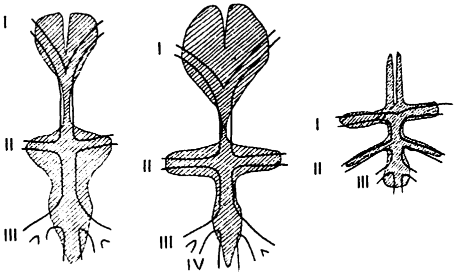


Fig. 1.—These diagrammatic drawings show the expansion of the thyroid gland in the three species: Oncorhynchus, Salvelinus and Opsanus. *I*, aortic bifurcation; *II*, *III* and *IV*, the second, third and fourth branchial arteries.

---

* An extensive analysis of the normal conditions of the Teleost thyroid will be found in Jour. of Morphology, V. 21, Suppl., 1911.

blood and lymph vessels. The latter force works chiefly in the early development of the gland, when thyroid cells are carried off from the main point of growth to distant regions, where they form new centers of multiplication.

The thyroid gland develops around the stem of the ventral aorta (Fig. 1), in many species the main bulk lying between the branches to the first and second gill arches. This locality is filled with connective tissue and fat, and is enclosed dorsally y cartilages or bones and ventrally by muscles. Thus the egion available for the thyroid tissue is rather limited, and herefore the follicles tend to fill every space that is offered y the surrounding structures. Not uncommonly follicles are ound far from the center of thyroid development, invading uscles (Plate 1, *C*) or creeping into the crevices which exist etween the osseous lamellæ of the bones in this region (Fig. and Plate 1, *A*).

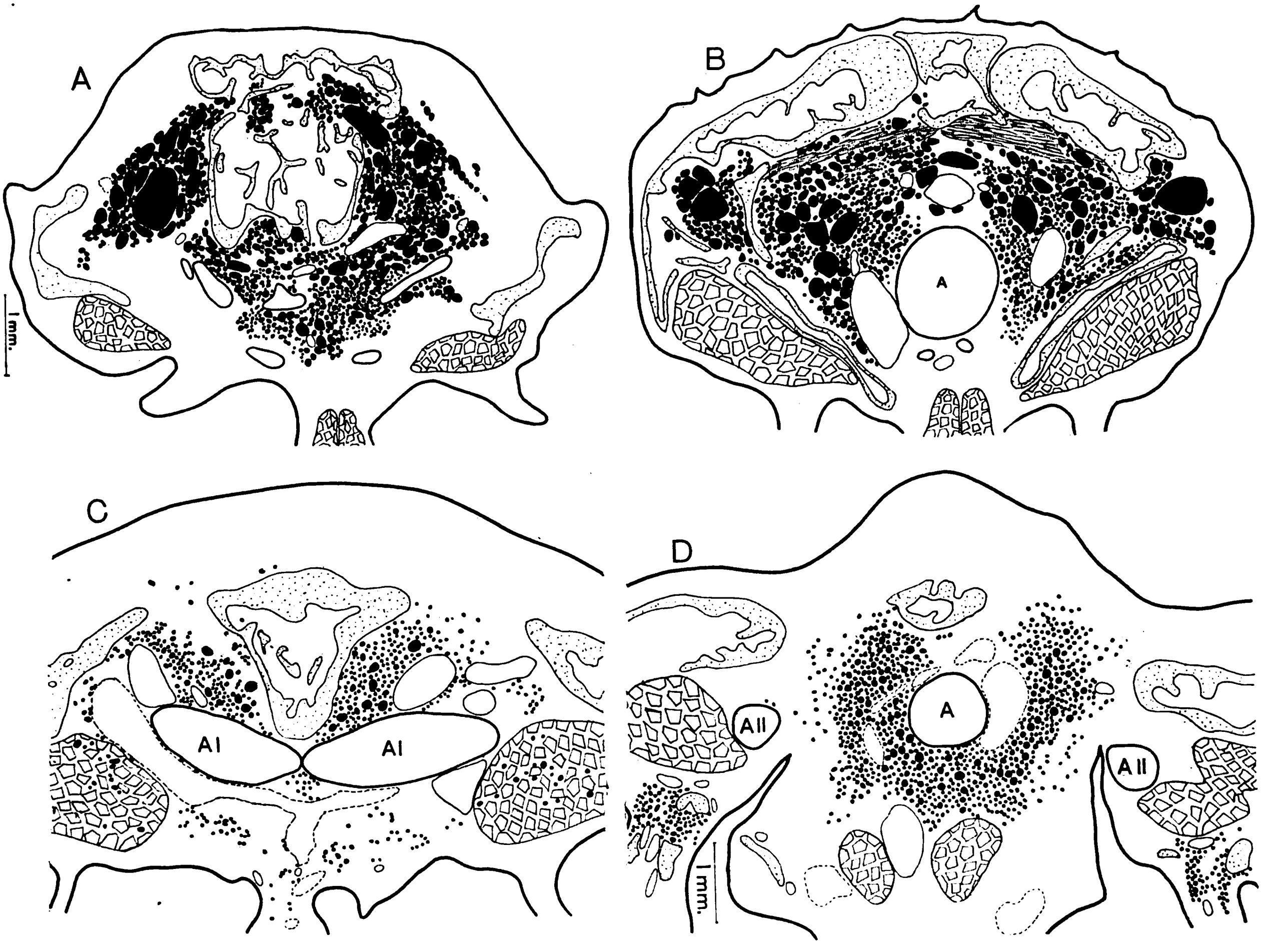


Plate I.—*A* and *B*, sections through the thyroid gland of Sarda. *A*, in the region of greatest extension anterior to the aortic bifurcation; *B*, near the second branchial arteries, the region of greatest extension. *C* and *D*, sections through the thyroid gland of Salvelinus. *C*, in the aortic bifurcation; *D*, near the second branchial arteries.

(Thyroid follicles in all figures shown in solid black. Transverse muscles lined. Longitudinal muscles in polygons. Skeletal parts stippled. Arteries in heavy lines. Veins in light lines. Lymph sinuses in broken lines. *A*, ventral aorta, *AI* and *AII*, branchial arteries.)

The thyroid gland of the Teleosts is thus a rather indefinite organ in its shape, having the tendency to lose its unity and break into numerous small parts. In some species, the trout and others, this tendency manifests itself most strikingly, so that thyroid follicles are found even far out in the gill arches along the gill filaments (Plate 1, *D*).

The spreading apart of the thyroid follicles over a wide area and the invasion of neighboring tissues are a normal feature and of no pathological significance. By such an invasion the surrounding structures are not destroyed. Often the term "invasion" is even incorrect. Thus Marine and Lenhart's statement that the normal follicles invade the bones is not appropriate, since they do not invade true bone or cartilage tissue, but merely the spaces that are present *between* the osseous or cartilaginous lamellæ (Fig. 2 and Plate 1, *A*). In their paper Fig. 6 demonstrates this fact definitely, although it is supposed to show a true invasion. On the other hand, Gaylord was able to show specimens in which thyroid tissue, belonging to a diseased gland, had actually invaded or infiltrated true cartilaginous tissue. The latter invasion, of course, is never seen in the anatomy of the normal gland, but is a strictly pathological feature. Whether or not it is due to a cancerous growth of the gland, may still be an open question. Strong evidence seems, however, to point in that direction.

Should the so-called thyroid carcinoma of brook trout be a cancerous growth and not a mere hyperplasia, as Marine and Lenhart believe, then the question of metastasis again demands the pathologist to keep in mind the lack of a capsule. Certainly no detached nodules in or around the gill region can safely be called secondary tumors, since such misplaced structures in all probability are merely parts of the primarily diseased gland. However, tumors on the tip of the jaw or around the anus, as Gaylord has found them, can hardly be explained as due to normally misplaced thyroid particles. Whether they are true secondary growths or simply implantations, further experimental investigations may show.

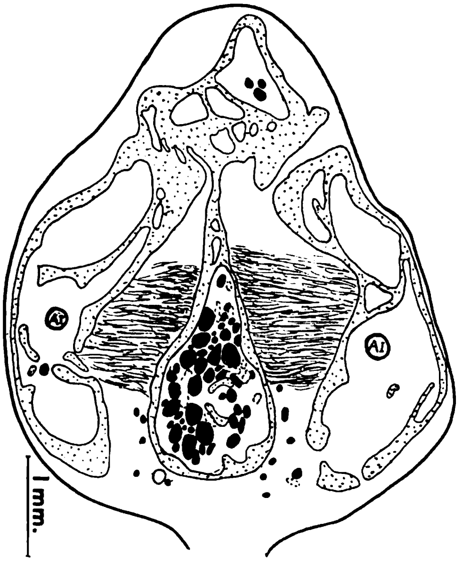


FIG. 2.—Section through the thyroid gland of Brevoortia, anterior to the aortic bifurcation. *AI*, first branchial arteries.

Histologically the thyroid gland of the Teleosts offers a great many interesting peculiarities. The size of the follicles varies between very wide limits. Aside from the fact that in young embryos it is naturally very small, the size of follicles cannot be taken as a reliable indication of the age of the fish. It seems much more probable that it is a sign of the age of the individual follicle.

The follicular epithelium varies from an almost flat to a very high, columnar type. It is different in each individual and may somewhat depend on the age and the physiological condition of the animal. Yet the type of the epithelium is not always uniform in all the follicles, sometimes very marked differences are found (Fig. 3). Even in the individual follicle the height of the epithelium may vary, probably due to different pressure from outside. It was now and then observed, that in oblong follicles the epithelium on the two longer sides would be lower than on the shorter ones.

The colloid material is sometimes present in all the follicles, in other glands it may appear in some only, in still others it may be entirely lacking. It, again, is no definite sign of the age of the animal, although it may be somewhat dependent on the age of the fish, its sex (egg-carrying females, for instance) and other inherent factors that need further investigation. The colloid certainly is a sign of the physiological state of the individual follicle, yet we do not understand it well enough to interpret our observations in a definite manner. There can be no doubt that all the follicles of a gland are not in the same state of physiological activity. Otherwise it cannot be explained why (Hürthle's) colloid-forming cells appear in some follicles only, sometimes in a group of neighboring follicles, so that we can easily distinguish "colloid zones" from non-colloid-forming parts of the gland.

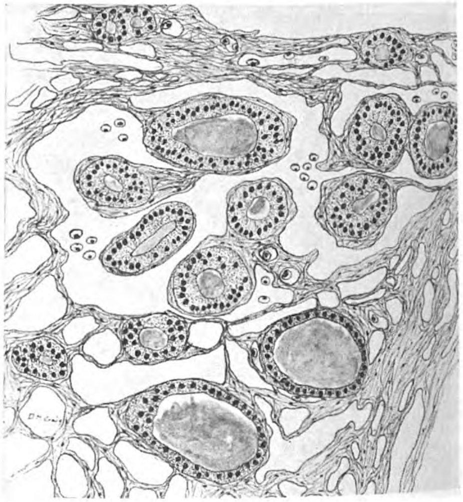


FIG. 3.—Section through the thyroid gland of Salvelinus fontinalis. Note the different heights of the follicular epithelium. Dia. 1:300.

In interpreting their results after iodin treatment of the thyroid gland of the pike Marine and Lenhart lay great stress on the histological appearance of the treated and not treated glands. Yet from the above discussion it seems obvious that the anatomy of the gland as well as its histology, as far as the type of epithelium and the colloid formation are concerned, makes it rather difficult for the microscopist to distinguish a normal from a hyperplastic, and the latter in turn from a "reverted" thyroid gland in these fish.

The presence or absence of the colloid material has no significance whatsoever. If all glands, the follicles of which spread out far from the main bulk even into the gill region, are highly hyperplastic, then, according to Marine and Len-

[illegible] yet it is present throughout the gland.

The type of the epithelium is also a perfectly unreliable guide in regarding a gland as hyperplastic. When, of course, the epithelium shows marked foldings and protuberances into the lumen, the hyperplastic condition is evident.

Further studies on the carcinoma of the fish thyroid will have to take into account the peculiar anatomy and histology of this organ in the Teleosts. Many conditions which might be regarded as pathological may prove to be normal as soon as our knowledge of all the factors involved is sufficiently broadened.

Gaylord, H. R.: An Epidemic of Carcinoma of the Thyroid Gland Among Fish. J. Am. Med. Ass., LIV, 227, 1910.

Gudernatsch, J. F.: The Structure, Distribution and Variation of the Thyroid Gland in Fish. J. Am. Med. Ass., LIV, 227, 1910.

Gudernatsch, J. F.: The Thyroid Gland of the Teleosts. J. of Morphology, XXI, 709, 1911.

Marine, D., and Lenhart, C. H.: On the Occurrence of Goitre (Active Thyroid Hyperplasia) in Fish. Johns Hopkins Hosp. Bull., XXI, 95, 1910.

Marine, D., and Lenhart, C. H.: Observations and Experiments on the so-called Thyroid Carcinoma of Brook Trout (Salvelinus fontinalis) and Its Relation to Ordinary Goitre. J. Exper. Med., XII, 311, 1910.

TUBERCULAR BURSITIS.

TWO UNUSUAL CASES.

By Sydney M. Cone, A. B., M. D., Baltimore.

There is a great deal being written to-day about diseases of the bursæ. The literature is full of references to acute and chronic inflammation of these sacs, and here and there may be found a description of a tumor of a bursa; syphilis is described involving it as is tuberculosis. The study of the anatomy and development, the pathology and clinical conditions involved in these diseases leaves little more to be added.

In Codman's report we get not only an exhaustive description of the anatomy and development of the subdeltoid bursa, but learn of the changes that may take place in this little known sac. He describes conditions that may be confused with bursal involvement, and the average medical man will be surprised to learn the seriousness of disease of this much overlooked anatomical structure. He will recall many cases of so-called sprain, rheumatism, tuberculosis, neuritis and other conditions about the joints which, in the light of recent investigations by conservative and scientific investigators, are oubtless bursal disease.

Many odd cases in the Johns Hopkins Dispensary called ainful shoulders, referred to by Dr. Finney (Johns Hopkins Hosp. Bull., 1894) are doubtless cases of subdeltoid bursitis.

Many cases of inflammation of the prepatellar and olecra- on bursæ have been recorded, but little thought has been iven to the possibility of similar involvement of many similar acs throughout the body.

Bursal disease is a common cause of painful conditions bout the heel and sole of the foot—many cases having been escribed in the orthopedic journals. Lund describes three ases of inflammation of the iliopsoas bursa, and Cullen gives e history and an excellent pathological description of a cyst the pelvis which developed from the iliopsoas bursa which ntinued its connection with the hip joint.

The numerous bursæ about the hip joint have been the seat pathological changes as described by Da Costa, Nicaise, rackett, Thurston, Wietung, Zuelzer, Ducroux and others. eale gives a case of suppuration of the bursa over the great ochanter and its immitation of hip disease. Brackett, in his article on "Gluteal Bursitis," likewise refers to the simulation of hip joint tuberculosis.

The greatest amount of literature on this subject takes the subdeltoid bursa as the text. Codman, Baer, Painter, Duplay, Bousquet and Kaumheimer cover this field quite thoroughly.

Acute infections due to various micro-organisms are recorded. Kaumheimer describes a purulent pneumococcus involvement following pneumonia. One of Duplay's cases was due to a streptococcus following erysipelas of the hand. Wegner, Heubner and others refer to a mixed infection following syphilis, and Kreuter describes a case of metastatic infection of the subdeltoid bursa from an original osteomyelitis of the femur. The gonococcus and influenza bacillus have likewise played their part in causing acute inflammation of bursæ.

The older writers referred in the main to syphilitic disease as evident in secondary and tertiary lesions. Churchman, writing on this subject, finds twenty-eight such cases in the literature describing them under the name "Luetic Bursopathy of Verneuil." Schuchardt who describes tubercular and syphilitic disease of bursæ in trying to solve the question of fibrin formation or fibrinöid degeneration of rice bodies in hygromas of tendons and bursæ, aids us materially in viewing clearly tubercular disease of bursæ.

Acrel in 1779 first described the "Ganglion Crepitans Acrelii" containing rice bodies which were doubtless tubercular. Dupuytren and Cruveillier likewise described cysts at bursal points containing rice bodies. Dupuytren called them hydatidiform cysts and thought the bodies parasites. Virchow noted them in hygromas and took them for fibrin, but confessed that he afterwards learned they were organized excrescences increasing in size by later gradual fibrin deposits. Although there is a close relationship in anatomy and pathology, between tendon sheaths and bursæ, one must distinguish the cases of tubercular tendo-vaginitis from those of tubercular bursæ for clinical purposes.

There is no doubt that the pathological descriptions of Acrel, Dupuytren and Cruveillier, and the works of Virchow, Neumann, Riese and others, on fibrin and fibrinoid bodies in tendon-sheath hygromas, apply to the bodies as found in bursal sacs. It is unfortunate that in describing or referring to their cases of tubercular bursæ Brackett, Thurston, Gillette, Ketch, Gibney and Sayre did not give more complete descriptions of their pathology. In none of these cases was reference made to fibrin or fibrinoid bodies. Brackett gave a short clinical history with seven cases of "gluteal bursitis" which he thought were tubercular. In Thurston's case we note that there was calcareous and cheesy material in the contents; but as he simply drained and did not examine the walls of the sac, there is left much of value to be inferred. And as Painter described yellow, cheesy, granular contents and villous enlargements in non-tubercular bursæ, and Cullen described bone, calcareous and cartilaginous masses in a simple cystic bursa, and Kreuter gives a simple subdeltoid bursitis containing cholesterin, fat and brownish fluid, we must still be in some doubt as to the true tubercular character of some of the cases (few as they are) described under the head of "tubercular bursæ."

So far as I can find, the cases of Schuchardt, Riese, Nicaise, Poulet and Vaillard are the only ones which present well-described tubercular bursæ containing rice bodies. They alone described bursal hygromas containing rice bodies. Most of the discussion as to the pathological histology and tubercle bacillus contents of the melon seed or rice bodies in hygromas has been based on work done on those found in connection with tendon-sheaths and joints.

"Tuberculosis of Bursæ" has certainly been not infrequently described, but not as a rule, in connection with rice body contents.

In some of the cases of tubercular bursitis which have been described there has been doubt as to whether the joint or bursa was the primary seat of the disease. In one of our two cases this relationship is a doubtful point. As a rule the question has not been settled. In a few cases—as for example, Thurston's and Brackett's—the rapid healing and disappearance of disease after relieving the bursa of its fluid and draining proves the joint uninvolved.

In some cases it has been demonstrated at operation that there was no connection between bursa and joint by which the disease could have extended from one to the other.

In other cases (Sayre, Lund, Cullen, Gibney and Brackett) a definite communication was demonstrated. From symptoms alone one cannot determine whether the joints are involved. The bursa when inflamed frequently leads one to think it a joint disease. Brackett, speaking of ordinary gluteal bursitis, says it resembles hip disease in its early stages. The X-ray is helpful, as, for example, in one of our cases where there was no evidence of bone lesion connected with the joint. The cloudiness about the joint was evidently due to the bursal contents covering the joint. At operation no communication was seen and incision into the joint showed no involvement. In our second case both joint and bursa were involved at the time of operation, the bursa being a dense mass of fibrous tissue and caseous tubercular material, while the joint showed villous masses of fibrous tissue with lymphoid tubercles in them. Which was the primary seat it is difficult to say. The fact that the disease of the bursa from pathological as well as from clinical data appeared older, would make us believe it to be the original focus of the tuberculosis.

Churchman tabulating twenty-eight cases of "Luetic Bursopathy of Verneuil," says that in only one case was the neighboring joint involved.

Several interesting pathological questions are brought to mind in studying these cases of tuberculosis of bursæ and the literature deals with each one in more or less detail.

The question which has been most actively studied is about the formation of rice bodies. In dealing with this question it has been assumed, and we think quite justly, that the so-called rice bodies including all fibrin or fibrinoid bodies of whatever shape or size, and wherever found, whether in bursæ, tendon-sheaths or joints, belong to the same class. In his work on the subject, Riese includes studies on rice bodies found in all three locations. He goes quite extensively into the history of the knowledge of rice bodies, referring to Acrel as the first, in 1778, to describe real rice bodies; he classified them as atheromatous, comparing them with boiled sago or corn grains. Dupuytren, Brodie, Rokitansky, Virchow, Meckel, von Recklinghausen and others held original views about them.

Cruveillier (1816) and Dupuytren (1839) dealt with them as hydatid cysts. Brodie (1821) considered them coagulated lymph. Rokitansky said they formed from abnormal fluid in the cysts. Virchow first recognized their relation to fibrin in 1846 and originally thought them coagulated masses—clots gradually formed. In 1856 he referred to them as coming from changed intercellular substance by the process of degeneration. Now no one disputes their relation to fibrin. The greater amount of discussion is based on the question—are the fibrin deposits from fluid, or are they changed cellular material, due to a coagulation necrosis, or degeneration of cells? This side of the subject takes up much of Riese's, Nicaise's and Schuchardt's work.

Konig (1884) was the first to recognize their tubercular origin, recognizing at the same time that they were formed by a coagulation necrosis of albuminous material.

Schuchardt acknowledges that rice body hygromas are always tubercular, but does not think that rice bodies wherever found are always due to tubercle bacilli. It would take us too far to describe the pathology of rice bodies in relation to the various structures where they have been found. Some of the most useful literature describing these fibrinoid objects has been found in connection with ganglia and tubercular arthritis. Evans (Am. J. Med. Sc., 1892) wrote the most comprehensive work on the subject in English. Nicaise, Paulet and Vaillard include in their work a combined study of tuberculosis of bursæ and tendons with rice body formations.

Schuchardt made a special study of fibrinoid degeneration of connective tissue under the heading "Tuberculosis and Syphilis of Tendon-sheaths."

We gather from the most enlightened and comprehensive recent writings that the rice bodies are to be considered as or from a coagulation necrosis of cells or intercellular substance in tubercular tissues.

There is considerable discussion of their mode of formation and relation to the tubercular walls of the containing sac whether bursa, tendon-sheath or joint. After all, we may go back to Virchow's expression of opinion to get at the basis of their formation. This includes some of the best that all express. He says, "I had taken them for clots of fibrin laid down concentrically, but I have since learned that they are organized excrescences. It is possible that they increase in size by gradual fibrin deposits." He thus includes both of the methods of formation, that of an organized material undergoing coagulation necrosis,—the method Schuchardt defends and the credit for proving which he gives to Neumann (Arch. f. mikr. Anat., XVIII, 1880)—and the method of concentric deposition of fibrin as advocated by Nicaise.

These bodies have been described by Nicaise as amorphous and slightly granular bodies with no enveloping membrane. 'They are stratified and here and there between the layers are ittle lacunæ containing bloody granules, refringent bodies like fat or round like leucocytes, but not taking the stain. There nay be some remains of connective tissue stained faintly red. . . . Perfect or incomplete tubercles are found in the sac walls—the very surface shows a varied structure sometimes of connective tissue fibres, again, a thin strip of reddish-brown homogeneous vitreous material under which may be seen a hemorrhagic film and a thin band staining like the rice bodies. . . . In the center of these one sees vestiges of necrotic cells; at times there is seen a layer of elongated cells, vaguely cylindrical, ending in a mass of granulation tissue beneath. On a evel with the surface project some little irregular masses, lightly adherent like beginning rice bodies made of layers doubled on themselves."

Riese says: "The smaller bodies are a meshwork of flaky omogeneous masses running together to form bands taking he fibrin stain. The center is deepest stained. Between ingle bands there may be seen irregular gaps in which are nely granular masses containing very few leucocytes. At ie periphery are some large nuclei (without perceptible pro-oplasm) and few leucocytes. In some there are seen masses f red blood cells stuck together by fine granules, but no brin is present in these."

The presence of tubercle bacilli was shown in the fibrin odies by all investigators either by staining them or inoculating guinea pigs.

The walls of the containing sac were invariably infiltrated ith round, epitheloid and giant cells in varying proportion, id as single or conglomerate or caseated tubercles. There is a varying amount of adherence to surrounding structures. ie greatest attention has been paid to the inner lining—this at showing either caseation or degeneration in lesser degree cellular material growing as villi.

It was with the desire to decide whether or not these villi re the origin of the rice bodies that Riese, Nicaise, Poulet d Vaillard, and Schuchardt did such extensive work.

necrosis of this surface material as being the point of origin of the rice bodies, while Nicaise seemed to find fibrin deposits or curled masses to account for their origin.

Reinhardt deals with an entirely different condition of the bursa caused by tuberculosis—"Primary Sclerosing Tuberculosis." It is analogous to the second case I describe.

He noticed about the trochanteric bursæ a number of fibrous nodules. These were thick and of a grayish color going suddenly over into the surrounding tissue. In them were seen little pinkish-gray areas 1 mm. in size. Microscopically they were dense connective tissue infiltrated by small round cells in areas; some fat was included. The connective tissue fibers were thick, interwoven and parallel. Some cells were elongated, some were more protoplasmic and stellate. The intima of the vessels was thickened and typical tubercles were seen near the perivascular infiltrated parts—consisting of giant cells of Langhans type, surrounded by epitheloid and round cells and leucocytes. Some areas were composed almost entirely of giant cells; some nodes showed central necrosis with broken down leucocytes or granular material.

Reinhardt records six cases like this and refers to their resemblance to fibroma and syphilitic gummata. The cases are in every respect like that of the prepatellar bursa described by me.

It is interesting to note in this place the varying form in which tuberculosis affects tissues. Reinhardt refers to the French authors, Poncet more especially, who wrote about "sclerosing tuberculosis due to a fibrous diathesis following finished tubercular processes." Ducroux, one of Poncet's followers, described a series of cases of tuberculosis of a "serous bursa" between the scapula and the chest wall which occasioned crepitus and friction sounds. "It is due to a chronic inflammation of a loose cellular tissue (a kind of spread out serous bursa)." He incidentally referred to Poncet's ideas about tuberculous rheumatism where specific anatomic lesions were wanting. He says, "This same condition occurred in tendons, bursæ, cellular organs and all tissues. Some of these cases might be called tubercular rheumatism."

We see in the two cases presented by me typical examples of the two types of tubercular involvement of bursæ described by these writers. They agree with them in all particulars, both in symptoms and pathology.

The condition develops insidiously, sometimes requiring years before the patient considers it worth while to consult a surgeon. He may think it due to rheumatism or a sprain. Examination of the part does not necessarily elicit pain or considerable disability of the part involved until late. There is usually muscle atrophy more or less limited to the parts immediately surrounding the involved bursa; in my cases the deltoid muscle alone showed atrophy.

X-ray examination showed nothing specific by which a diagnosis could be made in either case.

In one case the crepitus of masses in the bulging area was significant, whereas in the case of the prepatellar bursa there was nothing but a dense circumscribed projecting mass which could have been gummatous quite as well. It is interesting to note that in the shoulder case there was no involvement of the joint, whereas in the prepatellar involvement there were tubercular villi of long standing in the knee joint.

The main interest centers about the pathology of the cases—one representing the type of rice-body formation in a tubercular bursa, the other a chronic sclerosing tubercular process.

Case I.—J. F., white male, age 22 years. Admitted to the Hebrew Hospital, July 26, 1909, complaining of pain at and loss of function of the right shoulder.

Family History.—Good. No tuberculosis.

Past History.—He has always been strong and healthy, never sick in bed in his life.

Present Illness.—For about three years his right shoulder has been stiff on getting up in the morning; this would wear off after he had worked awhile. For the past three months it has been painful all the time. He cannot work because of the pain. It is more painful on motion. The pain is sharp, lancinating in character.

Physical examination shows fullness of the right shoulder, more apparent over the coracoid process, and crepitus under palpating fingers in front of the joint. Tenderness localized at the acromion process. He cannot raise the arm nor place it behind him because of pain. His grip is as strong with the right as with the left hand. He allows the arm to hang helpless by his side.

Measurements:

Right axilla over acromion	15½ in.
Left axilla over acromion	16 in.
Right biceps	10 in.
Left biceps	10½ in.
Right biceps (above).................	9¾ in.
Left biceps (above)..................	10¼ in.

July 29. X-ray shows rarefication over the tuberosity of the humerus and slight roughening here as well as at the upper portion of the glenoid fossa. Joint, negative.

July 29. Two milligrams tuberculin were injected subcutaneously, to which he reacted locally, focally and generally. There was swelling, tenderness and redness at sight of injection, pain the following day at the shoulder, and the temperature rose from 97.3° F. to 100° F.

Aug. 2. Operation, under ether: Incision from the acromion process outwards and downwards toward the deltoid insertion three inches long, through the deltoid muscle exposing a thick gray sac; this was easily exposed by blunt dissection anteriorly, but owing to adhesions about the tuberosity of the humerus and difficulty in getting the sac away above the coraco-acromial ligament, the sac was incised, when about 400 multifacetted bodies flattened against one another shot out, together with a thin serous fluid. The sac was now removed without difficulty. An incision was made into the joint at the point of greatest adhesion near the greater tuberosity; the joint was normal. The bone too was normal. The cartilaginous tip of the acromion process appearing translucent and soft, a longitudinal section 1.5 cm. long, was removed for examination. The muscle was sewed with a continuous cat-gut suture. Skin closed with continuous subcutaneous silkworm gut suture. A small wick of iodoform introduced; arm bandaged with Velpeau bandage, with a Gillette pad in the axilla.

Aug. 5. First dressing: Iodoform drain removed, wound dry.

Aug. 19. Patient discharged healed *per primam.*

Sept. 8. Patient readmitted, complaining of pain in his shoulder and a small sinus at the region of the acromion process in the line of incision. An X-ray was taken showing the joint negative—osteophytes are evident about the tuberosity of the humerus where an exploratory operation was done at the time of excising the bursa.

The sinus was treated and closed by September 22. He was discharged September 29 with arm in a sling, Gillette pad in axilla.

The patient was treated off and on for fistulæ which form about the site of the old operation—one forming posterior to axilla at the apex of the axillary fold. One formed about junction of the outer and middle third of the clavicle and inch below it.

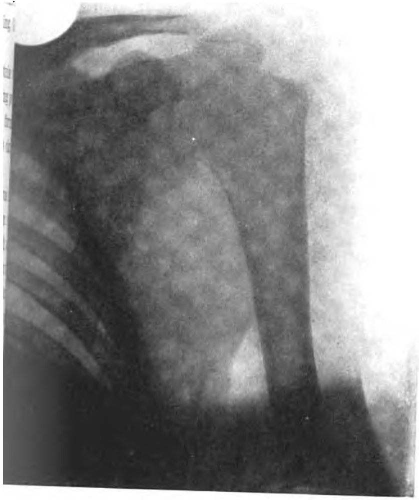
Jan. 24, 1910. While treating the sinuses it was noted that was coughing and an examination for admission to the Je Consumptive Home at Reisterstown showed both apices of lungs to be involved by tuberculosis. He was sent to the where I treated him. He was discharged much improved as regards his lungs and shoulder. He then went to the co and returned in excellent condition.

Oct. 15, 1910. The sinuses are all closed and the patient has been using the arm off and on since the operation is constantly using it. The muscles over the joint have no covered their tone, but the biceps reacts strongly and is atrophied.

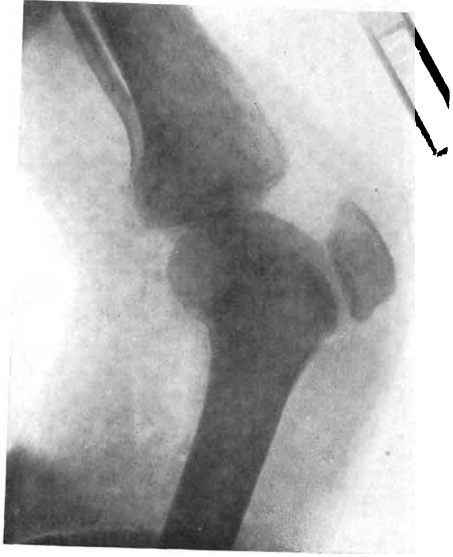
Pathological Description of the Case.

The sac containing about 400 grayish-white translucent bodies pressed into multiform shapes resembling in size and shape facetted gall stones, was 11 x 6 x 3 cm. in size, elongated oval in shape. Its wall varied in thickness from 3 mm. to 1 5/10 cm., was firm, homogeneous and gray in color with pinkish areas throughout. At its uppermost end under the acromion process it was a dense fibrous tongue of tissue wedged against the softened cartilaginous tip of the acromion process. Its inner lining was softer and of yellowish color, but smooth for the greater part, trabeculated here and there. The rice bodies stuck firmly in this meshwork. There were some few nodular areas, but no villous processes could be picked off until deeper in the walls of the sac. These nodular areas resembled the material of the rice bodies but were softer. The sac was in layers 2 mm. thick at the outermost shell. The outermost walls were hemorrhagic and shreddy, but dense connective tissue existed where the sac was adherent. The contents consisted of round, oval and facetted bodies varying from to 2 to 8 mm. in size; these were so densely packed that some force was required to separate numbers of them. Many of them fitted snugly depressions and pockets among the trabeculæ in parts of the wall of the sac. They were of a grayish-white color and translucent appearance—not very firm, the center being darker and softer than the periphery. They consisted of layers, the outermost being 2 mm. thick. These could be picked apart, easily cut, so that free hand sections were made for staining for fibrin and tubercle bacilli while yet fresh. There were some elongated shreds resembling the above but softer and more shreddy and darker, resembling blood-stained fibrin. Microscopic examination showed the bodies to be a granular loculated material staining with Weigert's fibrin stain and showing flakes, granules and strands. Traces of nuclei were faintly stained here and there. Tubercle bacilli were found with the Ziehl-Neelsen's stain.

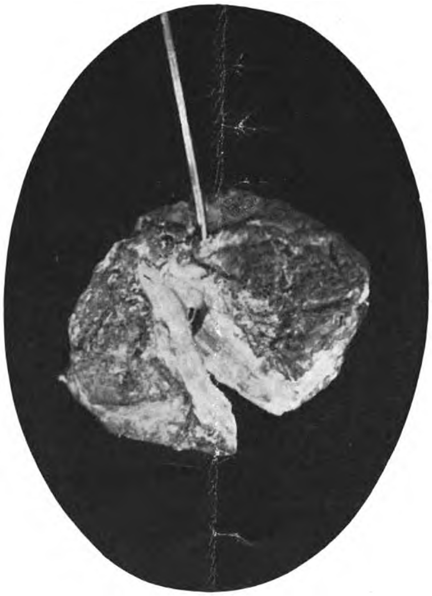
In acetic acid this material swelled showing a fenestrated



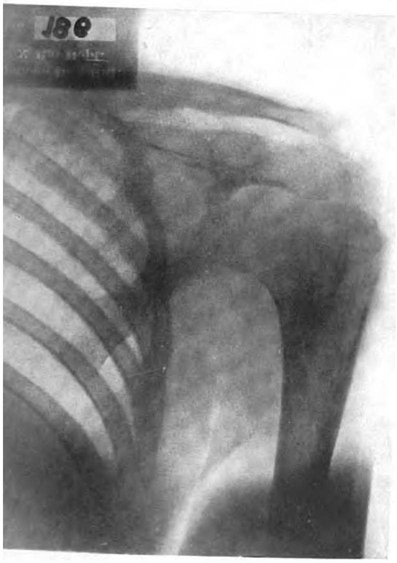
Case I.—Before Operation.



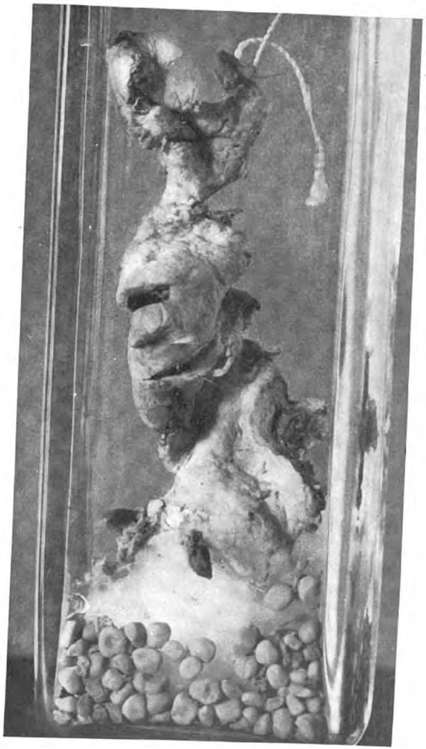
Case II.



Case II.—Tubercular Bursitis.



Case I.—After Operation.



Tubercular Bursa with Fibrin Bodies.

as rather porous but showed no cellular infiltration or hemorhage. The bone cells and lacunæ showed no pathological lteration.

The softened tip of the acromion process showed mucoid egeneration of the cartilage cells, some of them appearing in tellate forms.

Sections were made from many portions of the sac through s entire thickness. It showed typical tuberculosis and of arying histological structure, dense fibrous tissue containing reas of small round cells, small round cells and epithelioid ells, sometimes giant cells, sometimes caseation with these or reas where caseation was the only microscopic change seen. n places there were single and conglomerate tubercles. Many essels were occluded by two or three giant cells with few pithelioid cells, some small round cells about them. Fre- uently a gradation could be traced from the dense fibrous uter structure to the cellular, infiltrated, softer inner wall, degenerated non-staining cells and lastly to a lining of ranular or flaky non-staining material, with apparent lines f cleavage traversing it in some sections.

Where adhesions held the sac to surrounding parts near the iberosity of the humerus the outermost tissue was very much ongested and hemorrhagic, but was fairly well distinguished om the sac by the latter's dense structure, and its containing ounded spaces lined by tubercular giant cells. There were no ıfiltrating round cells or giant cells in this adherent wall.

Case II.—The second case is one where there was associated ıberculosis of the neighboring joint.

C. R., white male, age 24 years. Admitted to the Hebrew ospital, February 18, 1910, complaining of swelling over the repatellar bursa and swollen, painful left knee.

***Family History.*—Father died of Bright's disease. A brother ed of tuberculosis. Wife healthy, two sons healthy.**

***Past History.*—No serious illness until 20 years of age, when had typhoid fever. Never had venereal infection. He later ıd pleurisy.**

***Present Illness.*—Patient has had the swelling (nodular mass) er his patella for several years; it has not bothered him. He w complains of pain in the knee-joint which he traces to a fall ovember 27, 1909, when he struck the left knee; two days later e knee began to be painful. The pain was so great at night at he could not sleep. He was treated in the Dispensary of Hebrew Hospital, getting relief, so that the pain was inter- ttent. He could move the leg all right, except when it locked occasions.**

A physical examination showed the patient to be well de- loped and normal except for a tubercular focus in the apex right lung.

***Vote of Resident Physician.*—The left thigh and leg are smaller ın the right. The left knee is thickened and warmer than the ht, and tender on both inner and outer sides. There is a ap over the patella the size of a hickory nut, elastic to the ch, freely movable under the skin. The left leg may be ed on the thigh to a little more than a right angle.**

he tuberculin test was positive. There were 8800 leucocytes. ifferential blood count:

Polymorphonuclears	**57.00%**
Small mononuclears	**37.50**
Large mononuclears	**1.50**
Transitionals	**2.50**
Eosinophiles	**1.50**

the joint and the symptoms pointing to such a condition, he was operated upon on February 19, 1910.

***Operation.*—A long incision (4 inches) on the inner side, to include the prepatellar bursa, was made, and a shorter one along the outer side of the knee-joint.**

The capsule was incised and a number of tags of a pinkish-yellow color were removed. The largest of these 2½ cm. in length and pedicled, was loose in the joint. After closing the capsule with a continuous silk suture, the prepatellar bursa, a dense fibrous mass, was excised. The skin wounds were closed with subcutaneous silk-worm gut sutures, and the limb put in a plaster of Paris cast.

The wound did badly—the prepatellar area healed by granulation but the joint and surrounding tissues became involved in an active tubercular process until amputation of the limb was necessitated on August 11, 1910.

The mass removed from the prepatellar region, measuring 4 x 3 x 2 cm., was solid, fibrous, glistening white material which cut with difficulty, but showed softer grayish areas here and there. It faded gradually into the surrounding fat.

Microscopically it was a dense fibrous mass containing islands of small round cells, epithelioid and giant cells, and some caseous areas. It extended into the fat tissue by dense fibrous bands.

The tags removed from the joint showed masses of round and epithelioid cells and areas of degeneration.

The examination after operation of the muscle, glands and necrotic material from the joint showed active tuberculosis mostly epithelioid, giant and small round cells, with many polymorphonuclear leucocytes infiltrating the softer parts. Many conglomerate tubercles were present.

SUMMARY.

It will be seen that our cases correspond exactly to the types of tuberculosis of bursæ containing rice bodies, described, as in the first case, by Nicaise, Poulet and Vaillard, Leriche and Rhenter, and Schuchardt, and in the second case to the sclerosing type described by Reinhardt and Ducroux.

We can add nothing new to their work either in connection with the clinical findings or pathology. We trust that by calling attention to the rarity of the condition and giving references to the best that has been written in regard to this subject, besides adding our own confirmation of their findings, we may aid others in studying tuberculosis of bursæ.

BIBLIOGRAPHY.

Baer, W. S.: The Operative Treatment of Subdeltoid Bursitis. Johns Hopkins Hosp. Bull., 1907, XVIII, 282.

Bousquet: Un Cas de bursite tuberculeuse primitive de la bourse séreuse sous-deltoidienne. Montpel. Méd., 1904, XIX, 42.

Brackett, E. G.: Gluteal Bursitis. Tr. Am. Orthop. Asso., 1897, X, 123.

Churchman, J. W.: Luetic Bursopathy of Verneuil. Am. J. M. Sc., 1909, CXXXVIII, 371.

Clarke, W. C.: The Pathogenesis of Ganglia with a Description of the Structure and Development of Synovial Membrane. Surg., Gyn. and Obstet., 1908, VII, 56.

Codman, E. A.: Subacromial Bursitis or Periarthritis of the Shoulder Joint. Boston M. and S. J., 1908, CLIII, 159.

Cullen, T. S.: A Large Cystic Tumor Developing from the Iliopsoas Bursa. J. Am. M. Ass., 1910, LIV, 1181.

Da Costa, J. C.: Mod. Surg., 1910.

Ducroux, E.: Craquements et frottements sousscapulaires par bursite de nature tuberculeuse. Lyon, Thèse, 1905.

Duplay, S.: De la péri-arthrite scapulo-humérale et des raideurs de l'épaule qui en sont la conséquence. Arch. gén. de méd., 1872, 6 S., XX, 513.

Evans, Chas. S.: Ganglion and Teno-synovitis Tuberculous. Am. J. M. Sc., 1892, CIII, 643, and CIV, 38.

Finney, J. M. T.: Johns Hopkins Hosp. Bull., 1894, V, 83.

Goldmann, E. E.: Ueber das reiskoerperchenhaltige Hygrom der Sehnenscheiden. Beitr. z. path. Anat. u. z. allg. Path., 1889, VII, 299.

Kaumheimer, L.: Paraartikuläre Pneumokokkeneiterungen im fruehen Kindesalter. Bursitis und Tendovaginitis pneumococcica purulenta. Mitt. a. d. Grenzgeb. d. Med. u. Chir. Jena, 1910, XXI, 599.

Kreuter, E.: Ein Fall von Bursitis subdeltoidea als Beitrag zur Hygromfrage. Deutsche Ztschr. f. Chir., 1904, LXXII, 136.

Leriche and Rhenter: Un Cas de hygroma sous-deltoidien à grains riziformes. Lyon méd., 1908, CXI, 215.

Lund, F. B.: Iliopsoas Bursa: its Surgical Importance and the Treatment of its Inflammatory Conditions, with Report of Three Cases. Boston M. & S. J., 1902, CXLVII, 345.

Mosengeil, K.: Arch. f. klin. Chir., 1871, XII, 73

Nicaise, Poulet et Vaillard: Nature tuberculeuse des hygromas et des synovites tendineuses à grains riziformes; cas rare d'hygroma à grains riziformes de la cuisse. Rev. de chir., 1885, V, 609.

Painter, C. F.: Subdeltoid Bursitis. Boston M. & S. J., 1907, CLVI, 345.

Reinhardt, A.: Die primäresklerosierende Tuberkulose der Schleimbeutel. Deutsche Ztschr. f. Chir., 1909, XCVIII, 63.

Riese: Die Reiskörperchen in tuberkulöserkrankten Synovialsäcke. Deutsche Ztschr. f. Chir., 1896, XLII.

Schuchardt, K.: Tuberkulose und Syphilis der Sehnenscheiden. Beiträge zur Kenntniss der fibrinoiden Entartung des Bindegewebes. Arch. f. path. Anat., 1894, CXXXV, 394.

Sterne, J.: Hygroma aigu à pneumococques consecutif à une pneumonie. Rev. méd. de l'est, Nancy, 1908, XL, 440.

Teale, T. P.: On Suppuration of the Bursa over the Trochanter Major and its Occasional Imitation of Hip Disease. Lancet, 1903, II, 1355.

Thurston, E. O.: Bilateral Tuberculous Bursitis of Hips. Ann. Surg., 1907, XLVI, 919.

Virchow, R.: Krankhafte Geschwülste, 1863, I, 208.

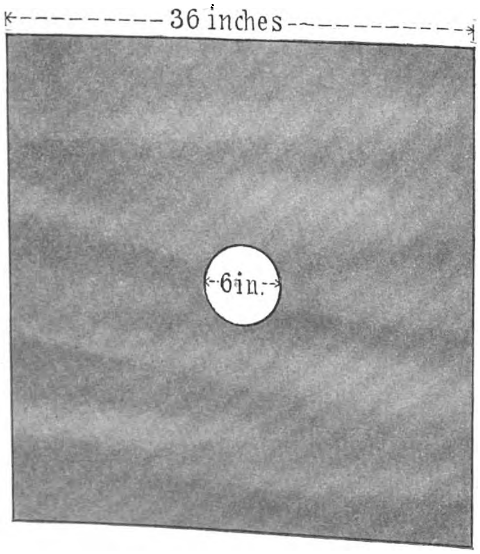
Wietung, J.: Beitrag zu den Affectionen, namentlich der Tuberkulose der Schleimbeutel in der Becken-Hueftgegend. Deutsche Ztschr. f. Chir., XXXIII.

Zuelzer, R.: Die Schleimbeutel der Huefte und deren Erkrankungen. Deutsche Ztschr. f. Chir., 1898, XLIX, 148.

A DEVICE TO AID IN KEEPING THE PATIENT DRY AFTER A SUPRAPUBIC CYSTOSTOMY.

By George Walker, M. D.,

Associate in Surgery, Johns Hopkins University, Baltimore, Md.



The device consists of a pure gum rubber sheet, 1 yard square, with a round hole in the center 6 to 8 inches in diameter. The material is similar to that used by dentists.

The sheet is laid on the patient immediately next to the skin so that the opening falls over the suprapubic wound. The usual amount of absorbent gauze is then laid on the wound, and the borders of the sheet are folded in, covering the gauze completely. The sheet with the enclosed gauze is held in place by an ordinary abdominal binder or Scultetus bandage.

By this arrangement whenever the gauze becomes saturated the fluid drains into the dependent portion of the sheet, where it collects and allows almost no leakage for several hours, during which time the patient's bed and clothing are kept dry.

When properly adjusted the sheet is also of very material aid in protecting the clothing when the patient is in a wheel chair or walking about.

A large opening in the rubber is necessary in order to supply a sufficient absorptive surface for the gauze.

This arrangement has been found to work admirably with some patients, keeping them almost dry; for others, owing to the configuration of the abdomen, it will prove less satisfactory, but in all cases it undoubtedly adds to the general comfort.

IN MEMORIAM.

DR. CHRISTIAN A. HERTER.[1]

Christian Archibald Herter was born in Glenville, Connecti-ut, September 3, 1865, and died at his home in New York ity, December 5, 1910, in the forty-sixth year of his age. is early education, partly by private teachers and at the olumbia Grammar School, was largely influenced and di-ected by his father, a man of wide culture and schol-rly attainments. He was graduated Doctor of Medicine at e College of Physicians and Surgeons (Columbia Univer-ity) in 1885. He pursued graduate professional studies at e Johns Hopkins University, and later in Germany and rance. He was Visiting Physician to the New York City ospital from 1894 to 1904, Professor of Pathological Chem-try at the University and Bellevue Hospital Medical College om 1898 to 1903, and since 1903 Professor of Pharmacology nd Therapeutics at the College of Physicians and Surgeons. e was a member of the Board of Referees appointed by the resident of the United States to act as advisers to the De-artment of Agriculture in the enforcement of the National ood and Drugs Act.

With the incorporation of the Rockefeller Institute for edical Research in June, 1901, Dr. Herter, who had been tive and influential in the preliminary conferences, became member of the Board of Directors, and served for a number years as its Treasurer. His death marks the first break in e membership of the Board as originally constituted.

From the date of his graduation in medicine, Dr. Herter's fe was one of singular devotion to the pursuit and advance-ent of scientific medicine—a devotion ever increasing and rning never more brightly than during the last years of a ogressive and wasting nervous affection. To this life-work brought the intellectual qualifications of the successful in-stigator of nature, good training, industry and enthusiasm. ith the scientific temperament was joined, in unusual de-ee, the imaginative and artistic, in music especially, his complishments being those of a virtuoso.

Opportunities for scientific research Dr. Herter created gely for himself, by constructing on the top floor of his use a well-equipped laboratory for experimental, patho-ical, bacteriological and chemical investigations, and by uring the services and co-operation of able assistants and laborators. From this private laboratory have issued dur- the last fifteen years numerous and valuable contributions. r. Herter was a prolific contributor to medical science, his lished articles and books numbering not less than seventy, covering a wide range of activity. His earliest scientific rest related to diseases of the nervous system, his first pub-tions in this field appearing in 1888, followed in 1889 by valuable study of experimental myelitis, and later by sev- articles of pathological and clinical interest, and by the lication in 1892, of the first edition of his text-book on he Diagnosis of Diseases of the Nervous System." After perimental pathology, and especially of pathological chemistry, being concerned with problems of metabolism, of the formation of gall stones, of glycosuria, of anæmia and toxæmia and of infantilism; and in the later years particularly with the study of the intestinal bacterial flora and intestinal putrefaction. His lectures on "Chemical Pathology in its Relation to Practical Medicine," published in 1902, met a most favorable reception. He approached pathological problems with broad biological, and even philosophical interest.

Dr. Herter's services to American medicine are not to be measured solely by his published contributions, valuable as these are. The example and influence of his personality and of the ideals which he represented made strongly for higher professional standards and for the wider recognition and cultivation of medical science. The lectureships which Dr. Herter, in association with Mrs. Herter, established upon wise and generous foundations at the Johns Hopkins Medical School and the University and Bellevue Hospital Medical College serve a most useful purpose in the promotion of scientific medicine.

It was mainly through Dr. Herter's instrumentality and generous support that the "Journal of Biological Chemistry" was established in 1905, and he was also active in the organization, in 1908, of the American Society of Biological Chemists.

Biological chemistry in this country owes a large debt to Dr. Herter, whose death after a little more than two decades of fruitful activity is indeed a severe loss to American medicine.

Dr. Herter's services were of great help in the planning and development of the Rockefeller Institute. After the opening last September of the hospital of the Institute, to which he had been appointed physician, and which owes much in its conception and general character as a research hospital to the time and thought devoted to it by him, Dr. Herter began to make use of the opportunities there offered, which seemed to be the fulfilment of his dreams for study of the problems of disease as presented by the living patient. The zeal and ardor with which he entered upon this work seemed to his colleagues wonderful, and indeed heroic, in view of the increasing and distressing physical infirmities of the last weeks of his life.

The memory of Christian Archibald Herter will continue to be a stimulating influence to be perpetuated and cherished as an example of good scientific work, of generous material aid in the promotion of medical science, of devotion to the best interests of his profession, of fine culture, loyalty of character, broad humanity and high idealism.

---

[1] Extract from Minute prepared for the Rockefeller Institute Medical Research by Dr. W. H. Welch.

THE JOHNS HOPKINS HOSPITAL BULLETIN.

It is issued monthly. Volume XXII is now in progress. The subscription price is $2.00 per year. (Foreign postage, 50 cents.) Price of cloth-bound volumes, $2.50 each.

A complete index to Vols. I-XVI of the Bulletin has been issued. Price, 50 cents, bound in cloth.

Orders should be addressed to THE JOHNS HOPKINS PRESS, BALTIMORE, MD.

NOTES ON NEW BOOKS.

Œdema: A Study of the Physiology and the Pathology of Water Absorption by the Living Organism. The Nathan Lewis Hatfield Prize Essay of the College of Physicians of Philadelphia, by MARTIN H. FISCHER, Professor of Pathology in the Oakland School of Medicine, Oakland, Cal. (*New York: John Wiley & Sons. London: Chapman & Hall. 1910.*)

Physiology and pathology depend so much upon the fundamental sciences that any attempt to bring them into closer relations must be welcomed by the medical reader. Dr. Fischer has considered the occurrence of œdema from the physico-chemical standpoint as merely one phase of the whole problem of the transfer of water into and out of the tissue cells, and this in turn as only an expression of the amount of water which the proteids of the tissues can absorb under the conditions in which they are placed. Under this conception conditions which favor absorption by colloids cause the tissues to take up water, while the conditions which lessen the absorption cause the tissues already saturated with water to excrete it.

His fundamental experiment is as follows: "If one leg of an ordinary frog or tree frog or a toad is ligated just above the knee as tightly as possible, so that the ligature shuts off not only the venous flow but also the arterial, and the animal is then placed in sufficient distilled water to cover the legs, the ligated leg develops an intense œdema, while the unligated one remains normal"—in spite of the fact that no circulation can take place through the blood vessels. "*It is clear,*" he states, "*that the cause of œdema resides in the tissues themselves and that these become œdematous not because water is forced into them, but because changes take place in them whereby they are enabled to absorb water from any available source.* In the case of the experiments on toads and frogs this available source is the water contained in the dishes in which the animals are kept. In clinical cases of œdema, this is found in the fluids which pass through or about a tissue." The immediate cause for this change in the properties of the tissues he supposes to be the production of acids, especially of lactic acid, in the tissues, which Araki has shown results whenever there is lack of oxygen.

Exactly the same experiments were described in 1898 by Dr. Jacques Loeb,[1] of whom Dr. Fischer was a pupil. In this paper Dr. Loeb demonstrated the formation of organic acids in the muscle after ligation, ascribed it to the lack of oxygen, and demonstrated that the muscle tissue took up water in proportion to the acid formation. It is unfortunate that Dr. Fischer, we believe unintentionally, has failed to do justice to the work of his illustrious predecessor and has described many repeated experiments in a manner which leads the casual reader to regard them as original. In interpretation, however, Dr. Fischer differs somewhat from Dr. Loeb, since he disregards entirely the rôles of cell or capillary walls and is unwilling to ascribe even a secondary rôle to filtration as a factor in the genesis of œdema.

Dr. Fischer gives a good discussion of Overton's theory that the surface of cells is made up of lipoid substances (such as lecithin, cholesterin, protogen, cerebrin, etc.) which in their properties as solvents are unlike ether or the fatty oils, and that only such substances penetrate the cells as are soluble in or miscible with these lipoids. Dr. Fischer himself regards the proteids of the surface as more important than the lipoids. He gives some interesting physico-chemical experiments to show that while acids facilitate the imbibition of water by gelatin, fibrin, muscle and sheep's eyes, this process is inhibited by various salts and inhibited most by the tartrates and citrates. He very ingeniously injects acids into gelatine plates with a syringe and shows that "wheals" are thus formed about the injection very similar to those due to insect bites (in which the poison is also an acid).

Dr. Fischer goes on to apply his theoretical conclusions to various clinical conditions, notably to glaucoma. He regards glaucoma as due to swelling of the colloids of the eyeball, similar to what occurs when the eyeball is placed in acid. He believes that it is independent of circulatory phenomena. Acting upon this suggestion the author and H. G. Thomas have used instillations of sodium citrate and tartrate in the treatment of glaucoma, and claim that the intraocular tension was diminished thereby. This theory of glaucoma has been criticised recently by E. v. Knape[2] and awaits confirmation.

Dr. Fischer also cites some interesting experiments on the removal of experimental œdemas in frogs by immersion in sodium citrate solutions, and states that Dr. John D. Long has successfully treated the œdema about inflamed joints by injection of sodium citrate—a result which the author has been able to duplicate by local injections of sodium citrate in œdematous tissues of cardiac disease and nephritis. These observations, though few in number, are of practical importance. If confirmed by further observation they may lead to a distinct advance in the treatment of œdema.

The rest of the book deals with œdema of the lungs, turgor, plasmolysis and plasmoptysis, the secretion of urine by the kidney and hæmolysis. The two latter sections are interesting and contain some suggestive experiments.

The style of the author is, in the main, clear and interesting. The book is well printed, and although italics are used somewhat freely they enable the casual reader to get some idea of the author's conclusions without a careful perusal of the text. The figures and curves are good and add to the clearness of the subject matter.

The book as a whole contains much and varied information with numerous references to suggestive articles. In spite of a good deal of special pleading it furnishes interesting reading even where one cannot agree with the author's views.

A. D. H.

Vicious Circles in Disease. By JAMIESON B. HURRY, M. A., M. D. (Cantab.), ex-President Reading Pathological Society. (*London: J. and A. Churchill, 1911.*)

In the fight against almost every disease the efforts of the physician may be baffled by the establishment of vicious circles in which one factor of the malady gives rise to and perpetuates another. Nevertheless, though a foreknowledge of the vicious circles that may be encountered may be almost as essential as the diagnosis and the initial treatment, clear-cut descriptions of vicious circles are rarely met with in textbooks; and in most of the latter only a small percentage of existing vicious circles are mentioned.

In this book Dr. Hurry has given the first systematic collection of the vicious circles which occur in medical practice and has illustrated their mode of production with excellent graphic representations, which add much to the clearness of the text. He has also collected a large number of instances in which the circles may be broken or reversed by therapeutic means. Such a book does not aim to supplant the text-book and is bound in a certain degree to sacrifice accuracy to brevity, but it cannot fail to furnish helpful suggestions to both student and practitioner, and merits the perusal of both.

A. D. H.

---

[1] Physiologische Untersuchungen ueber Ionenwirkungen, IV, Zur Theorie des Œdems. Arch. f. d. ges. Physiol., Bonn, 1898, lxxi, 469.

[2] Skand. Arch. f. Physiol., 1910, xxiii, 162.

Incorporated Society of Trained Masseuses. Price, $4.00.
(London: Henry Frowde and Hodder & Stoughton, 1911.)
Oxford University Press.

Miss Despard has written an excellent chapter on massage, d it is a pity the entire volume is not given to this alone, but e first 175 pages are devoted to the anatomy of the human dy, copiously illustrated with pictures more suited to students advanced anatomy than to those who are anxious to learn assage; only 75 pages are given to the most important part of e work, which is completed by two cursory chapters on band- es and electricity in conjunction with massage. The photo- aphs to show the different methods of giving massage are most tisfactory, and this text-book, even though we feel it is not ll balanced, is to be recommended without restriction to stu- nts of this art.

istory of Medicine. By MAX NEUBURGER, Professor of Medical History in the Imperial University of Vienna. Translated by Ernest Playfair, M. B., M. R. C. P. In two volumes. Vol. I. Crown, 4to. *(London: Oxford University Press, 1910.)*

To the Germans especially we are deeply indebted for critical d exhaustive study of the records of the past. Their matchless tience, their tireless industry and perseverance, their vast lin- istic resources and their judicial temperament, have borne rich rvests of literature. In no department have the results been ore conspicuous and important than in the field of medical his- ry, and the work before us affords striking proof of the fact. s Professor Osler points out in the Preface written by him, The output in Germany of works and monographs representing holarship of the first class is equal to the rest of the world put gether," and the immediate future is rich in promise of still ore important contributions. The libraries of Europe are being nsacked for new and revised Greek and Latin texts, which are be published under the auspices of the Imperial Academy of erlin and the Institute at the University of Leipzig for the udy of the history of medicine founded by the late Professor schmann. Meanwhile, we can feast on the treasures set before in Gurlt's monumental *Geschichte der Chirurgie* and the more cent encyclopedic general history designed by Puschmann, and his early death taken up and completed by his pupils, Pro- ssors Neuburger and Pagel, the latter of Berlin (1902-5).

It was to be expected that the elaborate researches undertaken these works, especially the latter, by so many distinguished holars, would lead to the production of a convenient manual bodying all that is essential for the student and the general der, and that has been accomplished by Professor Neuburger the work before us in a manner that gives no occasion for ything but praise.

The subject is treated in a fresh and animated style that holds reader's interest from beginning to end. The general narra- e is given in large type while the details are filled in with all type, an arrangement that is helpful and affords pleasing iety and relief. The principle of evolution is fully and con- tly recognized; yet progress has been far from uniform or tinuous. "The history of medicine is no calm, unbroken evo- on, but a series of advances by fits and starts, with interrup- s of subjective influence and with change of scene. . . . . y of the finest intellects squandered their energies upon esque error which obscured many valuable half-truths. . . . . most brilliant speculative systems barred the way to prog- and *a priori* deduction, not reconsidered in the light of ex- ence, served but to lead medicine astray."

ll justice is done to the new discoveries made in Mesopo- a and Egypt, the science of pick and shovel and the elucida- of cuneiform inscriptions having opened to us in the former and Assyrians, reaching back beyond 3000 B. C., while the famous Ebers and Bugsch papyri in the latter furnish records of little less antiquity. Yet the beginning is not yet, for back of these was an already protracted period of development, of which Babylon and Nineveh were only the most historically important products.

Egypt has left deeper traces upon the memory of man than Babylon, a fact which is to be attributed to its intimate relations with the nations bordering on the Mediterranean, to Jewish and Greek literature, especially the Bible and Homer, and to the striking and mysterious remains found in the Valley of the Nile. But the records already brought to light, according to Neuburger, hardly substantiate the superiority of the Egyptians over their Eastern predecessors, either in religion or science, while their claim to originality is becoming more and more doubtful.

It is interesting to learn that there are traces of auscultation in the Ebers papyrus; also that hygiene and prophylaxis occupied so predominant a status and had reached so astonishing a development among the ancient Egyptians. But other nations, as the Indians, led by their religious views, appear to have paid scarcely less attention to it. Neuburger concludes that it is clear that Egypt exercised a powerful influence upon the social hygiene of the Jews, upon Greek medicine and through these upon the development of mankind.

One of the finest sections of the entire work is that dealing with "the matchless collection of writings bearing the name of Hippocrates, greatest of all physicians," to whom the School of Cos owes its transcendant title to fame. But it can no longer be maintained that these writings emanated exclusively from Hippocrates; "in the light of searching criticism they are nothing but the motley, heterogeneous output of generations, the intellectual product of many thinkers, whose individual voices only chance has united to form a single chorus by no means invariably harmonious." Yet there is an individuality permeating them which is traceable to the strong influence of a single dominating personality. This personality looms up grandly but dimly through the ages, like a stream with many springs, vivifying and inexhaustible; admired by all, really understood by few, imitated by many, equalled by none, the master of medicine for all time. We may conclude that the Hoppocratic ideal will live, unfettered by doctrines, to remotest ages.

Not inferior in breadth and clearness is the section relating to Galen and his system—"the climax of scientific effort in ancient medicine."

One is struck with the frequency with which the author inculcates caution as to final judgment. This applies not only to the medicine of the early periods, the Babylonic-Assyrian and Egyptian, but also to that of later times, as the Arabian. To quote in the latter case: "Since the manuscripts which have been so far investigated bear only a small proportion to the extent of the original literature, and considering the possibility, by no means unprecedented, that research may bring forth surprising discoveries, it follows that we are not at present in a position to express a final opinion upon the achievements of Arabic medicine in detail." This is the true historic attitude of a mind ever open to the reception of new truths and ready to be convinced.

The author's fairness is everywhere manifest and even when forced to condemn he finds something to praise. He seeks to judge events from a contemporary standpoint which is the only way to do justice to them. This is particularly seen in dealing with the Methodists, whose most shining adherent was the celebrated gynecologist, Soranus of Ephesus.

In conclusion, we will only say that we have found nothing to criticise in this incomparable work which will stand for many years to come as the leading text-book on the subject.

The work of the author has been ably seconded by Ernest Playfair, who has given us a spirited and scholarly translation, in which he has steered clear of the German idiom, a thing so difficult to do in translations from that language.

We shall await with deep interest the appearance of the second volume dealing with a much larger subject and one more closely connected with present-day medicine.

The style of the book needs no comment, as the excellence of the Oxford publications is well known.

E. F. C.

BOOKS RECEIVED.

Interne Klinik der bösartigen Neubildungen der Bauchorgane. Von Priv.-Doz. Dr. Rudolf Schmidt. Mit einer Farbigen Tafel. 1911. 8vo. 355 pages. Urban & Schwarzenberg, Berlin, Wien; Rebman Company, New York.

Diseases of the Anus, Rectum, and Sigmoid. By Samuel T. Earle, M. D. With 152 illustrations in the text. 1911. 8vo. 476 pages. J. B. Lippincott Company, Philadelphia and London.

The Care and Training of Children. By Le Grand Kerr, M. D. 1910. 12°. 233 pages. Funk & Wagnalls Company, New York and London.

The Dawn of the Health Age. By Benjamin Moore, M. A., D. Sc., M. R. C. S., L. R. C. P. 1911. 12°. 204 pages. J. & A. Churchill, London; The Liverpool Booksellers' Co., Ltd., Liverpool; P. Blakiston's Son & Co., Philadelphia.

"Salvarsan" or 606 (Dioxy-Diamino-Arsenobenzol) Its Chemistry, Pharmacy and Therapeutics. By W. Harrison Martindale, Ph. D. Marburg, F. C. S., and W. Wynn Westcott, M. B., Lond., D. P. H., H. M.'s Coroner for North-East London. 1911. 8vo. 77 pages. Paul B. Hoeber, New York.

Bismuth Paste in Chronic Suppurations. Its Diagnostic Importance and Therapeutic Value. By Emil G. Beck, M. D. With an Introduction by Carl Beck, M. D., and a Chapter on the Application of Bismuth Paste in the Treatment of Chronic Suppuration of the Nasal Accessory Sinuses and the Ear, by Joseph C. Beck, M. D. With eighty-one engravings, nine diagrammatic illustrations, and a colored plate. 1910. 8vo. 237 pages. C. V. Mosby Company, St. Louis.

The Treatment of Syphilis by the Ehrlich-Hata Remedy (Dioxy-Diamido-Arsenobenzol). A Compilation of the Published Observations. By Dr. Johannes Bresler. Second edition, much enlarged, with the portraits of Ehrlich and Schaudinn. Translated by Dr. M. D. Eder. With an Abstract of the Most Recent Papers. 1910. 12°. 122 pages. Rebman Limited, London; Rebman Company, New York.

Accidental Injuries to Workmen. With Reference to Workmen's Compensation Act, 1906. By H. Norman Barnett, F. R. C. S. With Article on Injuries to the Organs of Special Sense. By Cecil E. Shaw, M. A., M. Ch., M. D., and Legal Introduction by Thomas J. Campbell, M. A., LL. B. [1909.] 8vo. 376 pages. Rebman Company, New York.

Remedial Gymnastics for Heart Affections Used at Bad-Nauheim. Being a translation of "Die Gymnastik der Herzleidenden" von Dr. Med. Julius Hofmann und Dr. Med. Ludwig Pöhlman. By John George Garcon, M. D. Edin., &c. With fifty-one full-page illustrations and diagrams. 1911. 8vo. 128 pages. Paul B. Hoeber, New York.

Makers of Man. A Study of Human Initiative. By Charles J. Whitby, M. D. (Cantab.) With forty-seven half-tone and other plates. [1910.] 8vo. 424 pages. Rebman Company, New York.

Golden Rules of Ophthalmic Practice. By Gustavus Hartridge, F. R. C. S. "Golden Rules" Series. No. VII. Fifth Edition. [1910.] 32°. 72 pages. John Wright & Sons Ltd., Bristol. Simpkin, Marshall, Hamilton, Kent & Co., Ltd., London.

The Principles of Pathology. By J. George Adami, M. A., M. D. LL. D., F. R. S., and Albert G. Nicholls, M. A., M. D., D. Sc. F. R. S. (Can.). Volume II. Systemic Pathology. Second edition, revised and enlarged with 301 engravings and 15 plates. 1911. 8vo. 1160 pages. Lea & Febiger, Philadelphia and New York.

Handbook of Treatment for Diseases of the Eye. (Ophthalmic Therapeutics). By Curt Adam. With a Preface by Prof. von Michel. Translated from the second German edition (1910) by William George Sym, M. D., F. R. C. S. Ed., and E. M. Lithgow, M. B., F. R. C. S. Ed. With thirty-six illustrations. [1910.] 12°. 264 pages. Rebman Company, New York.

Plastic and Cosmetic Surgery. By Frederick Strange Kolle, M. D. With one colored plate and five hundred and twenty-two illustrations in text. 1911. 8vo. 511 pages. D. Appleton and Company, New York and London.

Modern Treatment. The Management of Disease with Medicinal and Non-Medicinal Remedies. In Contributions by American and Foreign Authorities. Edited by Hobart Amory Hare, M. D., assisted by H. R. M. Landis, M. D. In Two Volumes. Volume II. Illustrated. [1911.] 8vo. 900 pages. Lea & Febiger, Philadelphia and New York.

A Handbook of Practical Treatment. By Many Writers. Edited by John H. Musser, M. D., LL. D., and A. O. J. Kelly, A. M., M. D. Volume I. 1911. 8vo. 909 pages. W. B. Saunders Company, Philadelphia and London.

Blakiston's ? Quiz-Compends ? Compend of Gynecology. By William Hughes Wells, M. D. Fourth edition, revised and enlarged with 153 illustrations. 1911. 12°. 290 pages. P. Blakiston's Son & Co., Philadelphia.

Diseases of the Joints and Spine. By Howard Marsh, M. A., M. C. Cantab., F. R. C. S. New and enlarged edition thoroughly revised by the author and C. Gordon Watson, F. R. C. S. With 4 colored and 8 black-and-white plates, and upwards of 100 illustrations in the text. 1910. 12°. 632 pages. Chicago Medical Book Company, Chicago.

Atlas of Microscopic Diagnosis in Gynecology. With Preface and Explanatory Text by Dr. Rudolf Jolly, Priv. Doc. Only authorized English translation by P. W. Shedd, M. D. With 52 lithographs in color and 2 textual figures. [1911.] 4to. 192 pages. Rebman Company, New York.

A Manual of Physical Diagnosis. By Brefney Rolph O'Reilly, M. D., C. M. (F. T. M. C., Toronto; M. R. C. S., Eng.; L. R. C. P., Lond.). With 6 plates and 49 other illustrations. 1911. 12°. 369 pages. P. Blakiston's Son & Co., Philadelphia.

The Johns Hopkins Hospital Bulletins are issued monthly. They are printed by the LORD BALTIMORE PRESS, Baltimore. Subscriptions, $2.00 a year (foreign postage, 50 cents), may be addressed to the publishers, THE JOHNS HOPKINS PRESS, BALTIMORE; single copies will be sent by mail for twenty-five cents each. Single copies may also be procured from the BALTIMORE NEWS CO., Baltimore.

BULLETIN

OF

THE JOHNS HOPKINS HOSPITAL

Entered as Second-Class Matter at the Baltimore, Maryland, Postoffice.

. XXII.—No. 243.] BALTIMORE, JUNE, 1911. [Price, 25 Cents

CONTENTS.

PAGE

ıhydrate Tolerance and the Posterior Lobe of the Hypophysis ɔerebri. An Experimental and Clinical Study. (Illustrated.) By EMIL GOETSCH, HARVEY CUSHING AND CONRAD JACOBSON 165

Distortions of the Visual Fields in Cases of Brain Tumor. Statistical Studies. (First Paper.) (Illustrated.) By HARVEY CUSHING, M. D., and GEORGE J. HEUER, M. D. 190

Notes on New Books 195

RBOHYDRATE TOLERANCE AND THE POSTERIOR LOBE OF THE HYPOPHYSIS CEREBRI.[1]

AN EXPERIMENTAL AND CLINICAL STUDY.

BY EMIL GOETSCH, HARVEY CUSHING AND CONRAD JACOBSON.

(From the Johns Hopkins Hospital and the Hunterian Laboratory of Experimental Medicine.)

SUBJECT HEADINGS.

Introduction.
  Presupposition of a lowered assimilation limit.
Methods followed in the experiments.
Protocols of hypophysectomies, demonstrating:
  Early post-operative lowering of carbohydrate tolerance.
  Ultimate overtolerance for carbohydrates.
  The relation of this overtolerance to posterior lobe deficiency.
Summary of experimental results.
The assimilation limit in clinical cases of dyspituitarism.
  Ultimate increase of tolerance in acromegaly and gigantism.
  An increased tolerance the rule in all cases of primary glandular deficiency.
  Effect of posterior lobe extracts in lowering the assimilation limit.
  Relation of the high assimilation limit to adiposity.
  Therapeutic dosage.
Influence of ductless glands in general and hypophysis in particular on tolerance for sugars.
  Historical summary. Acromegaly and diabetes.
  Explanation of the discrepancies in past studies.
Résumé and conclusions.

I. INTRODUCTION.

the series of 100 experimentally hypophysectomized ls observed in this laboratory in 1908-1909,[2] certain unlooked for symptoms were found to occur in a number of the animals surviving for long periods after a partial removal of the gland. They were interpreted as manifestations of pituitary insufficiency and laid—erroneously as we now believe—solely at the door of anterior lobe defects. The most noteworthy of these symptoms was a tendency toward adiposity, coupled with genital dystrophy; the females failed to go into heat and sexual indifference or impotence was apparent in the males, some of whom showed a definite testicular atrophy.

A histological study of the ductless glands of this series of animals demonstrated the occurrence of alterations in all of them as a consequence of the primary hypophyseal lesion. The conjecture was a natural one that possibly some of the clinical symptoms which had been observed were due to these secondary changes in other members of the ductless gland series, rather than that they were a primary outcome of the pituitary deficiency itself—an indirect rather than a direct effect, in other words. For example, it was conjectured that the adiposity might be due to defective testicular or ovarian secretion and thus be akin to the adiposity following castration; that the transient glycosuria which was observed in a few instances might be due to a hyperplasia of the thyroid or adrenals, or to a state of lowered activity of the islets of Langerhans, or even perhaps of the pancreatic acini themselves.

With this suggestion in mind it was proposed among other objects to devote our 1909-1910 series to a more careful histological scrutiny of the changes in these other glands. We directed our attention particularly to the alterations which occur in the pancreas and its islets, with results which will appear in

---

sented by Dr. Cushing at the meeting of the American logical Society held in New Haven, December, 1910.

J. Crowe, Harvey Cushing and John Homans: Experi- hypophysectomy, THE JOHNS HOPKINS HOSP. BULL., 1910, 7-169.

a subsequent paper. These studies naturally led us into an investigation of the carbohydrate tolerance of the hypophysectomized animals, and our observations in this direction form the basis of this present communication, in which reference will also be made to certain clinical applications of our findings.

In the earlier series (1908-1909) as recorded by Crowe, Cushing and Homans, though polyuria was commonly observed, the immediate post-operative presence of a reducing substance in the urine had been noted in a few instances only. It was naturally ascribed to the anæsthetic. The animals in our present series (1909-1910) were observed with greater care in this respect, and it was learned that an early and spontaneous glycosuria might be anticipated in the majority of the animals. This was particularly true of those subjected to the operation for total removal, whether or not the gland proved subsequently to have been extracted in its entirety; for it is in this procedure that the hypophyseal stalk is manipulated and crushed in a particular way.

As this post-operative glycosuria proves to be transient, it is a natural supposition that many cases which would have shown a reducing substance were overlooked in the series of the previous year, since the routine of examining the first voided specimen was not followed. Furthermore, in view of the marked polyuria which usually occurs, if the first specimen, with its definite reducing properties, is allowed to become diluted with the total day's amount the early and transient appearance of a reducing substance may readily escape notice on a casual examination of the mixed 24-hour specimen—another possible source of error.

It must be said, however, that in a number of the animals in our present series a trace of the reducing substance often persisted for a day or two, the early typical reduction of Fehling's solution gradually fading to a mere greenish-yellow discoloration—referred to as an "atypical reduction" and probably not due to dextrose. The reducing body of the earlier specimens, it may be added, gives a positive yeast fermentation test and is dextro-rotatory.

After a fragmentary hypophysectomy this spontaneous post-operative glycosuria was found to occur with less regularity, though as our charts will show, a temporarily lowered assimilation limit may be expected even under these circumstances. This fact suggested that the character of the glandular manipulations was the essential element in the production of the glycosuria, rather than the operative method of approaching the gland or the administration of the anæsthetic: for the surgical procedure and the duration of the performance are practically the same whether the object be a partial or a total removal. The chief difference between the two operations lies in the manner of treating the stalk, for in the partial removals this structure need not, and should not, be damaged by the glandular manipulations. On the other hand, in the extirpation destined to be total, after freeing the vascular dural attachment of the posterior lobe, the infundibular attachment of the dangling gland is pinched off in the forceps as high up as possible, so that as little as may be of the pars intermedia is left adhering to the infundibular stalk and tuber cinerium. If the manipulations have been successful the isolated gland is then lifted out intact.

Needless to say, in all of the animals the urine was examined previous to the operation, and it may be noted that in the large number of dogs subjected to hypophysectomy in our present series no instance of pre-existing glycosuria has been observed. In order to test the relation of the anæsthetic to the problem, a number of animals of the average size and age employed in this series were anæsthetized with ether for corresponding periods without the subsequent appearance of a reducing body in the urine. For further control, a few typical operations were carried to the point of free exposure of the gland, but without subjecting the structure itself to any manipulation. These animals also showed no reducing substance in the urine.

These primary observations, disclosing the frequent occurrence of glycosuria immediately after a total hypophysectomy, led us to conjecture that the assimilation limit in these animals would subsequently be found to be altered, and it was presupposed—erroneously as events proved—that a permanently lowered carbohydrate tolerance would be demonstrable. This furthermore is the view which has been the basis apparently of all previous investigations.

With this preconception, a primary test was made upon two young dogs of approximately the same size and age, one being hypophysectomized, the other used as a control. A day or two after the spontaneous post-operative glycosuria of the former puppy had disappeared, a diet of white bread in equal amounts was given to the two animals. The reducing substance promptly reappeared in the urine of the animal subjected to operation, whereas the urine of the control had no reducing properties. Contrary to our expectation, however, this lowered assimilation limit shown by the hypophysectomized animal did not persist, and after a number of days even forced feeding with white bread failed to produce glycosuria in either animal. It was evident that the carbohydrate tolerance, distinctly lowered during the early post-operative period, had again increased after an interval of a few days. Whether the former assimilation limit had merely been regained or whether an actual increase in tolerance had become established could not, of course, be determined by such a crude experiment.

Having in mind, therefore, that the post-operative spontaneous glycosuria bore a definite relation to the surgical manipulations of the gland and that the brief period of carbohydrate intolerance was followed by a re-establishment of tolerance at least to the normal, it was determined to test these points more systematically.

II. CONDUCT OF EXPERIMENTS.

Healthy young dogs, averaging about one year of age and usually of the fox-terrier type, were chosen as subjects. Each animal was confined in a carefully constructed metabolism cage for a number of days before the operation, on a diet consisting of 125 to 150 gms. of lean ground beef. This was boiled to obviate the intestinal disturbances engendered by the feeding s, during the preliminary tests to establish their normal ar tolerance, remained in good condition with normally ned stools, and uncontaminated urine could be obtained.

n performing the hypophysectomy we have followed the ıe operative methods practiced in the Hunterian Labora- r during the past two or three years and fully described by we, Cushing and Homans. The surgical difficulties asso- ed with this delicate procedure may with experience be so ıpletely overcome as to enable one to remove, in the average , the entire structure, the anterior or the posterior lobe, or ctically any desired proportion of either lobe. After one learned to free the posterior dural attachment of the ıd at the point of entry for the vessels to the para nervosa,[3] dislocation and removal of this separate lobule, together ı its epithelial investment is one of the simplest of the ous forms of glandular mutilation. However, there need ly be any uncertainty at the time of operation as to the ree of success of the attempted measure, whatever it may

In the entire series, nevertheless, not only have the frag- its removed at operation been sectioned, but in every case al sections have been made of the interpeduncular block issue removed post mortem. This block should include the of the third ventricle, the optic chiasm and the entire tents of the sella turcica, together with its dural lining. y in this way is it possible to establish beyond equivocation only the size but the state of functional activity of the ıdular fragment which has been left.

n the carbohydrate assimilation tests definite weighed unts of cane sugar dissolved in warm water were admin- red by a stomach tube. In all cases the normal tolerance he individual animals was approximately established by a s of determinations previous to the hypophysectomy, and post-operative tolerance was established by the same hod after varying intervals of time.[4] For a number of ons we have in most cases preferred to work on the basis lerance for carbohydrate ingested rather than given in- enously. It gave us a better estimate of the power of rption, destruction and storage of sugar than could have acquired had the carbohydrate been thrown in large ınts directly into the circulation. Furthermore, the ani- were less inconvenienced and fewer abnormal factors were duced than would have been the case with such frequent venous injections as the tests would have required. After r two experiences tractable animals accept the stomach without resistance.

ccharose was chosen—despite its being a somewhat more lex body than glucose—partly for the reason that if the als drooled into the cages after the administration of the there would be no danger of contamination of the urine administered by mouth. Needless to say, the cages were thoroughly and frequently cleaned, and in case one of the animals acquired diarrhœa during the progress of the experiments sugar feeding was interrupted and all specimens of urine under the suspicion of contamination by converted saccharose which had been carried through the intestinal canal and ineffectually screened out, were discarded. However, the chance of error on this score with cane sugar feeding seems very slight; for in a few animals afflicted with diarrhœa, causing an obvious contamination of the urine, the dextrose tests were always negative provided the amount of sugar administered had been below the assimilation limit.

In some animals in the late post-operative stages, when the assimilation limit became very high, the large amount of carbohydrate would not always be completely retained by the stomach. If any sugar was regurgitated, however under such circumstances the urine would betray this fact by its high specific gravity and content of mucus and food particles and the findings could be disregarded. Scrupulous observance of these precautions should eliminate the possible sources of error associated with this manner of making the tests.

However, for purposes of control, tests were made in certain cases with the intravenous injection of from 20 to 25 per cent glucose solution.[5] In a number of instances, furthermore, extracts of posterior lobe, of anterior lobe and of thyroid gland were administered hypodermically, intravenously or by mouth, simultaneously with the sugar feeding, with the results to be recorded below.

III. Protocols of Experiments.

At the outset of our investigations it was unknown to us whether the obvious disturbances of carbohydrate metabolism were associated with the activity of the pituitary body as a whole or with the function of one or another of its anatomical subdivisions. We were somewhat prejudiced in favor of the anterior lobe, in view of the stress laid on this portion of the gland in the earlier studies from this laboratory. Thus in practically all of the cases of spontaneous post-operative glycosuria and in the instance of white bread feeding related above, we were dealing with animals subjected to a complete or to a nearly complete extirpation of the entire gland—animals, in other words, in whom the characteristic symptoms of acute glandular deficiency (cachexia hypophyseopriva) were likely to appear after intervals varying from two to three weeks. As the carbohydrate tolerance was first systematically studied in connection with operations of this type the results may be presented at the outset, for though they are far less striking than in the case of the longer lived animals they nevertheless show points of interest.

Four of our observations (Nos. 60, 63, 57, 66) belong in this group. In two of them the normal tolerance was established for cane sugar by mouth, and in the other two for glu-

---

ndy and Goetsch: The blood supply of the pituitary body. . *Anat.*, 1910, XI, p. 137.

d we been cognizant when these studies were undertaken of ore refined methods of quantitative determination of the output in the urine we would have been spared the tedium e repeated tests to establish the tolerance.

[5] In order to prevent the introduction of an unnecessarily large amount of fluid into the circulation, the more concentrated solutions were used as the assimilation limit increased.

cose intravenously, before the hypophysectomy. All four animals promptly recovered from the operation, but it was necessary to sacrifice them in from two to three weeks owing to the onset of symptoms of cachexia. Nevertheless the post-operative observations made in this interval showed in two cases a transient spontaneous glycosuria, in three cases a temporary lowering of the assimilation limit and in three a slight increase in the tolerance before death even in this short period. This restoration of the normal tolerance and a final slight increase over the former assimilation limit was shown for the intravenous as well as for the intraoral method of sugar administration. For the purpose of comparing these two methods both of them were employed in one individual (No. 58) in a subsequent group.

A. *Observations on the changes of the assimilation limit for cane sugar by mouth and glucose intravenously in animals deprived of nearly the entire gland.*

The first four protocols therefore will record the observations made upon animals subjected to a complete or nearly complete glandular extirpation. Needless to say they have been shorn of practically all data unrelated to the subject in question.

No. 60.—(Series of 1909-10.) *Primary lowering of tolerance for cane sugar by mouth during week after operation. Subsequent rise to normal. Tests interrupted by attack of distemper with onset of cachexia hypophyseopriva on 23d day.* (Table I.)

TABLE I.—TESTS OF TOLERANCE FOR CANE SUGAR BY MOUTH IN No. 60.

Date.	Grams of cane sugar given.	Urine.					
		Amt.	Sp.Gr.	Fehling.	Nylander.	Fermentation.	Polariscope.
May 17	0	160	1032	0	0		
" 18	70	240	1050	0	0		
" 20	80	240	1020	+	+	+	
" 21	90	150	1022	+	+	+	
" 28	Nearly complete hypophysectomy; small fragment of anterior lobe remaining.						
" 29	0	110	1038	0	0		
" 30	0	120	1028	0	0		
" 31	60	90	1044	+	+		
June 1	60	240	1060	+	+	+	
" 2	50	80 (?)	....	0	0		
" 3	70	300	1060+	+	+	+	
" 4	70	140	1040	+	+	+	.6%
" 6	70	200	1046	0	0		
" 7	80	150	1050	+	+	+	.3%
" 8	0	150	1030	0	0		
" 10	0	200	1040	0	0		

A healthy male, 6.6 kilo, adult fox terrier about one year of age. Kept in metabolism cage for four days prior to operation to determine normal assimilation for saccharose by mouth (cf. Chart I). Tolerance established between 70 and 80 gms.

May 28. Operation.—Removal of posterior lobe and practically entire anterior lobe; gland fragmented in removal. Operative estimate a "nearly total" hypophysectomy. A small tag, supposedly of anterior lobe, left adherent at infundibular stalk.

May 29.—No post-operative polyuria or glycosuria.

May 31-June 10.—Establishment of post-operative tolerance at about 20 gms. below normal on the third and fourth days. Subsequent rise to 80 gms., the normal tolerance. Rapid accession of body weight from 6.6 kilos to 7.4 kilos during period of sugar ingestion.

June 13.—Symptoms of distemper led to a discontinuance of further tests.

June 20.—Distemper followed by usual manifestations of ensuing cachexia. Animal sacrificed.

Autopsy.—Apparently an almost total removal. A small granule, which might be glandular substance visible at the base of the stalk. No recognizable posterior or anterior lobe. Nothing of special note in the gross examination of the other organs. Infundibular block, including contents of sella turcica, preserved as usual for serial sectioning.

Histological.—The two fragments removed at operation proved upon microscopical examination to be the intact posterior lobe and a large portion, if not all, of the anterior lobe.

The autopsy specimen showed on serial sections a few cells of the intermediate lobe type adnerent to the infundibular floor. No anterior or posterior lobe seen—in short, a more complete extirpation than had been intended.

Comment.—The observation is not a particularly valuable one. The operative intent had been to leave just enough of the anterior lobe to preserve the life of the animal, a total removal of this lobe being incompatible with life, as has been shown. Attention has been called to the fact that an animal under these circumstances is particularly susceptible to infections or to intestinal derangements, which are apt to precipitate the acute symptoms of excessive glandular deficiency shown by a fall in temperature, tremors, arching of the back, a slowed respiration and ultimate coma. The distemper which occurred on the 26th day interrupted the tests and provoked these terminal symptoms.

It will be noted that no spontaneous post-operative glycosuria and polyuria were observed. This is so exceptional as to make us fear that a first specimen may have been lost or unrecorded. A temporarily lowered assimilation limit, however, was apparent, for on the third day 60 gms. of saccharose produced glycosuria, whereas 80 gms. had been required before the operation. By the ninth day the original sugar tolerance was practically regained, 80 gms. again giving a slight reduction. Attention is drawn to the increment in body weight of nearly 12 per cent during the sugar feeding period of 10 days.

No. 63.—(Series of 1909-10.) *An increase of tolerance for saccharose by mouth seven days after a "nearly total" hypophysectomy. Attempted reduction of tolerance by the hypodermic in-*

TABLE II.—TESTS OF TOLERANCE FOR CANE SUGAR BY MOUTH IN No. 63.

Date.	Grams of cane sugar given.	Urine.					
		Amt.	Sp.Gr.	Fehling.	Nylander.	Fermentation.	Polariscope.
May 31	0	310	1048	0			
June 1	60	150	1050	0			
" 2	70	340	1030	0			
" 3	80	260	1020	+	+		
" 5	80	280	1015	+ slight	+	+	.3%
" 6	0	180	1040	0	0		
" 7	Nearly complete hypophysectomy; small fragment of anterior lobe remaining.						
" 8	0	400	1020	0	0		
" 9	0	440	1010	0	0		
" 10	0	120	1040	0	0		
" 11	0	140	1022	0	0		
" 12	70	10 (?)	....	0	0		
" 13	80	210	1028	0	0		
" 14	90	110	1022	+	+	+ slight.	.3%
" 16	90	150	1034	0	0		
" 17	100	210	1032	0	0		
" 18	110	180	1028	0	0		
" 19	120	330	1020	+	+		

after 30 days. (Table II.)

A healthy male, 9.1 kilo, fox terrier, about six months of age nd apparently full-grown. Observed for six days previous to peration. *Normal tolerance* to cane sugar feeding established at omething below 80 gms.

June 7. Operation.—A nearly total removal of the gland. No rgical difficulties. Prompt recovery from the anæsthetic. No ost-operative complications.

June 8-9.—A moderate polyuria without demonstrable glycoria.

June 12.—Animal in perfect condition. Feeding tests begun th 70 gms.; negative.

June 14.—Glycosuria first induced by 90 gms., more than 10 ove the established normal.

June 16-19.—The tolerance increased in this interval (cf. Chart to something below 120 gms., 40 gms. above the established rmal.

une 21.—One hundred grams of sugar with a coincident hypomic injection of posterior lobe (0.5 gm.) caused immediate niting, whereas this amount had been readily taken before.

une 24.—A repetition of the experience of June 21: prompt niting of 80 gms. On June 26 a similar experience with 80 gms.

une 30.—Subnormal temperature with onset of symptoms of hexia. Animal sacrificed.

utopsy.—The naked eye examination of the floor of the third tricle and of the sella turcica disclosed no definite glandular ucture. The other organs showed nothing of note beyond a bening pneumonia and a mediastinal abscess.

istological.—Microscopical examination of the tissue extirpated operation showed it to consist of the entire, unbroken, posor lobe and a large fragment of anterior lobe. Serial sections he autopsy material disclosed a remaining small group of le anterior lobe cells and the usual tag of pars intermedia—ther words, a "nearly total" extirpation.

omment.—This second case merely serves as another ince of an increase in the tolerance to cane sugar by mouth to 120 gms.) after removal of nearly the entire hypophy- It also illustrates the tendency of posterior lobe injection roduce vomiting of ingested sugars. Otherwise the record no especial interest. It is another exception to the genrule regarding a post-operative spontaneous glycosuria. ptoms of cachexia hypophyseopriva doubtless supervened he intrathoracic infection of obscure origin. A viable nent of anterior lobe was left, sufficient in size to have rved life under ordinary conditions.

57.—(Series of 1909-10.) *Determination of tolerance for venous glucose solutions after nearly total hypophysectomy. ary fall followed by a secondary rise exceeding the normal. ction of the increased tolerance by the hypodermic adminisn of posterior lobe extract. Onset of cachexia hypophyiva on the 12th day.* (Table III.)

e 3.—A healthy, 7.6 kilo, fox-terrier bitch, about 7 months of pparently full-grown, was observed for six days previous to tion, on the usual standard diet. The animal's *normal tol- was established at approximately 6 gms. of glucose adtered intravenously in 20 per cent solution into the extergular.

e 9. Operation.—Extirpation considered as practically to- Fig. 1.) Prompt recovery from the anæsthetic. Animal re- to metabolism cage. No operative or post-operative comons of any kind.

FOR INTRAVENOUS INJECTION OF GLUCOSE IN No. 57.

Date.	Cubic centimeters of fluid injected.	Grams of glucose injected.	Urine.					
			Amt.	Sp. Gr.	Fehling.	Nylander.	Fermentation.	Polariscope.
June 3	0	0	130	1022	0	0		
" 4	25	5	200	1040	0	0		
" 5	35	7	50 100	1048 1030	+ 0	+ 0	+ 0	1% 0
" 6	30	6	100	...	+ sl.	+ sl.	+ sl.	.2%
" 7	0	0	120	1050	0	0		
" 8	30	6	230	1030	+ sl.	+	+	.2%
	Nearly total hypophysectomy.							
" 9	0	0	400	1015	+	+	+ sl.	.2%
" 10	0	0	200	1014	0	0		
" 11	0	0	200	1030	0	0		
" 12	20	4	60	1040	+	+	+	.3%
" 13	17.5	3.5	90	1050	0	0		
" 14	25	5	100	1042	0	0		
" 15	25 c. c. 25% sol.	6.25	120	1040	0	0	.	
" 16	0	0	140	1042	0	0		
" 17	30	7.5	100	1044	0	0		
" 18	35	8.75	110	1034	0	0		
" 19	40	10	70	1042	+	+	+	1.1%
" 20	25 cc. + 0.05 gm. post. lobe hypo.	6.25	60	1044	+	+	+	.2%

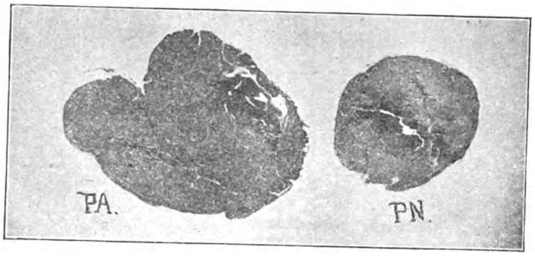


FIG. 1.—Nine diameters magnification of posterior and anterior lobe of No. 57, removed at operation. Bensley; 5 μ; iron-hæmatoxylin. Pars nervosa (P N) dislocated from its bed in anterior lobe (P A) during removal.

June 9-10.—Slight post-operative polyuria with spontaneous glycosuria on first specimens voided.

June 10-11.—Animal in perfect condition. Polyuria and glycosuria have subsided.

June 12.—Four gms. of glucose intravenously caused a reappearance of the glycosuria—an amount 2 gms. below the established pre-operative normal.

June 12-20.—Intravenous tolerance for glucose gradually increased during this period, until on June 18 intravenous injection of 8.75 gms. of glucose did not cause glycosuria, but 10 gms. on the following day gave a positive reduction.

Post-operative tolerance therefore estimated at slightly below 10 gms.—4 gms. over the pre-operative normal.

June 20.—A smaller dose of carbohydrate, namely, 6.25 gms. of glucose, given coincidently with a hypodermic injection of .05 gm. of posterior lobe extract caused glycosuria.

June 23.—The animal was sacrificed owing to the onset of symptoms of cachexia hypophyseopriva.

Autopsy.—The naked eye examination of the base of the brain and sella turcica confirmed the operation as a nearly total removal of the gland. No apparent fragments of either lobe. Nothing noteworthy on gross examination of other organs. Tissues preserved and sectioned in the usual manner.

Histological.—Serial sections of the infundibular region reveal merely a small residual fragment of pars intermedia adjacent to

the infundibular stalk (Fig. 2), confirming the practical totality of the extirpation.

Comment.—In this animal an earlier attempt to determine the carbohydrate tolerance by mouth had been abandoned, owing to persistent regurgitation, and recourse was had to the injection methods. The case demonstrates that the tolerance for glucose intravenously behaves in precisely the same manner as that for cane sugar by mouth. In other words, there is a lowered assimilation limit for the first few days after operation and a subsequent increase over the normal as determined before operation.

The protocol clearly indicates that in these states of increased sugar tolerance the coincident hypodermic injection of a small amount of posterior lobe extract may lower the tolerance at least for glucose administered intravenously and cause a temporary glycosuria. Attention may be called to the fact that the injection of posterior lobe extracts does not serve to ward off states of threatened cachexia hypophyseopriva, as does the administration of anterior lobe or whole gland extracts. If the whole gland had been used not only might these terminal symptoms have been at least postponed, but the lowering of the sugar assimilation limit would have been shown as well.

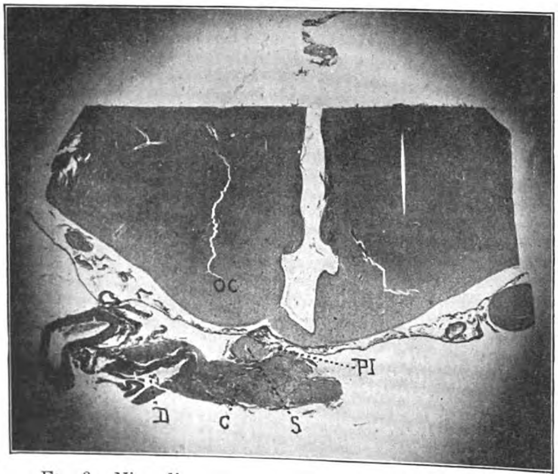


FIG. 2.—Nine diameters magnification of one of the series from the interpeduncular block of No. 57. Section No. 25; 5 μ; Helly; H and E. Showing small fragment of stalk (S) with few adherent pars intermedia cells (P I), organized clot (C), vessels and sellar dura below (D), commissure (D C).

No. 66.—(Series of 1909-10.) *Relative tolerance for intravenous glucose solutions before and after a practically complete hypophysectomy. Demonstration of post-operative increase in tolerance which could be lowered by the coincident hypodermic injection of posterior lobe extract. Acute symptoms of apituitarism on the 12th day.* (Table IV.)

June 4.—A healthy, 6.9 kilo. dog, about one year of age, was confined in a metabolism cage on the usual diet for six days previous to operation. The *normal tolerance* for 20 per cent glucose solutions introduced into the external jugular was established at about 7.5 gms. 1.04 [illegible]

June 10. Operation.—Usual technique. A supposedly total extirpation. Gland removed intact. Prompt recovery from the anæsthetic. No post-operative complications.

June 11.—A marked polyuria (2700 cc. in 24 hours), with spontaneous glycosuria showing only in the first voided specimen.

June 12-19. No injections were made during this interval.

June 20.—Injections resumed. Eight grams negative.

June 21.—Intravenous injection of 10 gms. of glucose in 25 per cent solution—2½ gms. above the pre-operative tolerance established on June 9—produced no glycosuria.

June 22.—An injection of 11.25 gms. was likewise negative showing that the *post-operative tolerance* was at least more than 3.75 gms. above the previously established normal.

June 23.—The intravenous administration of 10 gms. with a coincident hypodermic injection of .05 gm. of posterior lobe extract, produces glycosuria.

June 24.—Animal ill; slow pulse and respiration with subnormal temperature evidence the onset of symptoms of hypophyseal cachexia. Sacrificed.

Autopsy.—A total removal, judging from naked eye appearance of the base of the brain. No gross lesions in the other organs.

Histological.—The tissue removed at operation proved to be the major portion if not the entire gland. The autopsy specimen showed the presence of an intermediate lobe fragment, and the entire absence of the posterior lobe and characteristic cells of the anterior lobe.

TABLE IV.—TESTS OF TOLERANCE FOR INTRAVENOUS INJECTION OF GLUCOSE IN No. 66.

Date.	Cubic centimeters of fluid injected.	Grams of glucose injected.	Urine.					
			Amt.	Sp. Gr.	Fehling.	Nylander.	Fermentation.	[illegible]
June 4	0	0	140	1030	0			
" 5	0	0						
" 6	25	5	90 190	1026 1026	0 0	0 0		
" 7	35	7	120	1022	0	0		
" 8	40	8	140	1032	+	+	+	[illegible]
" 9	37.5	7.5	120 150	1010 1020	+ 0	+ 0	+ sl.	[illegible]
" 10	0	0	120	1042	0	0		
	Total hypophysectomy.							
" 11	0	0	2700	1006	1st spec + 0	+ 0	+ 0	
" 12	0	0	700	Some feces.	0	0		
" 13	0	0	640	1012	0	0		
" 14	0	0	720	1008	0	0		
" 15	0	0	6 (?)	1040	0	0		
" 16	0	0	720	1008	0	0		
" 17	0	0	510	1010	0	0		
" 18			450	feces.	0	0		
" 19			410	feces.	0	0		
" 20	40	8	360	1022	0	0		
" 21	40	10	520	1020	0	0		
" 22	45	11.25	320	1016	0	0		
" 23	40 + 0.5 gm. post. lobe hypo.	10	120	1020	+	+	*	[illegible]

* Not determined.

Comment.—This is a second illustration of increase in the intravenous tolerance to glucose. In twelve days the tolerance rose to more than 3.75 gms. over the normal determined before operation, an increase of 50 per cent. Here again an injection of posterior lobe extract served temporarily to lower the acquired degree of overtolerance.

B. Observations on sugar tolerance after deprivation of a portion of the anterior lobe alone.

We have seen that operative removal of the anterior and posterior lobes together may cause a primary fall and subsequent rise above the normal in the assimilation limit for whether this acquired capacity for storing carbohydrates depends upon the loss of either subdivision of the gland singly, or whether it is related to the cessation of function in the structure as a whole.

In the earlier studies from this laboratory particular stress vas laid upon the physiological importance of the pars anerior. As an outcome of some of the earlier experiments in he present series we became aware that our predecessors had ttributed the post-operative disturbances which they observed o exclusively to this subdivision of the gland. Their attenion had at first been directed more particularly to the acute isturbances leading up to cachexia hypophyseopriva—a state hich supervenes on the loss of the entire gland—and this brupt upsetting of the physiological equilibrium they had roperly ascribed to deficiency of the anterior lobe, for posrior lobe extirpation seemed in no way incompatible with e maintenance of life.

So far, however, as the acquired tolerance for carbohydrates concerned a deficiency of the anterior lobe seems to play, at ast relatively, a very insignificant rôle. This is shown, stly, in negative fashion by the failure of animals deprived a portion of the anterior lobe alone to acquire a high posterative tolerance; and, secondly, in more positive fashion by fact that an acquired overtolerance can be lowered much re effectually by the injection of posterior lobe extracts n by the injection of extracts or emulsions of the pars anior. Indeed such positive reductions in the assimilation limit actually followed injections of anterior lobe extracts we are lined to attribute to some fragments of pars intermedia t may easily have clung to the anterior lobe during the chanical separation of the two glandular subdivisions in the cess of preparing the separate extracts.

t will be seen in the following experiment that a partial reval of the pars anterior led to the usual immediate postrative lowering of tolerance due to the operative manipulas. However, there was no subsequent acquirement of overrance, such as seems to be inevitable when the posterior lobe been removed, whether alone or coincidently with some of pars anterior.

). 50a.—(Series of 1909-1910.) *Determination of the assimila- limit for cane sugar by mouth before and after removal of a ment of the anterior lobe. Posterior lobe remaining, though matized. Effect of hypodermic administration of posterior extract on the established tolerance.* (Table V.)

ril 15.—A healthy, 8.5 kilo, adult fox-terrier bitch. *Normal ance* for saccharose administered by mouth estimated at t 110 gms. (i. e. between 110 and 115 gms.). It was found this normal assimilation limit could be reduced by the coint injection of small amounts of posterior lobe extract. Thus suria would occur with only 70 gms. of sugar given with onetieth of a gm. of posterior lobe extract.

y 17. Operation.—Removal of a considerable fragment, pos- one-third, of the anterior lobe. The posterior lobe was ly traumatized but was not removed. The animal made a pt recovery from the anæsthetic and operation, and remained during the succeeding days of observation. The first specivoided after operation showed a slight glycosuria.

post-operative polyuria. Animal in excellent condition.

May 22.—120 gms. of saccharose by mouth showed a reduction.

May 24.—110 gms. gave a mere trace of reducing substance. Tolerance about the same as before operation (cf. Table V, April 19 and 28).

May 27.—A hypodermic injection of .05 gm. of posterior lobe extract with 70 gms. of saccharose gave the same degree of glycosuria as on May 5 before the operation. Animal sacrificed.

Autopsy.—Naked eye examination of the base of the brain shows the hypophyseal stalk and much of the gland itself intact. The interpeduncular block and the dura of the sella turcica were dissected out as usual in one piece and fixed for sectioning.

Histological.—The small fragment removed at operation proved to be pars anterior alone: no pars intermedia included. Serial sections of the interpeduncular block removed at autopsy showed a normal intact posterior lobe and a large fragment of anterior lobe.

TABLE V.—TESTS OF TOLERANCE FOR CANE SUGAR BY MOUTH IN No. 50A.

Date.	Grams of cane sugar given.	Injection of glandular extracts.	Urine.				
			Amt.	Sp.Gr.	Fehling.	Fermentation.	Polariscope.
Apr. 15	50	....	250	1035	0	0	0
" 16	65	....	350	1010	0	0	0
" 17	80	....	450	1035	0	0	0
" 18	100	....	300	1020	0	0	0
" 19	115	....	260	1030	0	0	0
" 21	105	....	400	1040	+	+	1.3% D. R.
" 28	110	....	500	1030	0	0	0
May 4	90	.05 gm. post lobe hypo.	700	1030	0	0	0
					+	+	1.5% D. R.
" 5	70	.05 gm. post. lobe hypo.			+	+	1.0% D. R.
" 17	Partial hypophysectomy: fragment of anterior lobe alone removed.						
" 17	....	....	1st spec.		+	+	1.5% D. R.
" 18	....	....	860	1006	0	0	0
" 19	....	....	850	1005	0	0	0
" 20	....	....	850	1008	0	0	0
" 21	....	....	600	1007	0	0	0
" 22	120	....	600	1030	+	+	0.7% D. R.
" 24	110	....	700	1030	+ susp.	0	0
" 26	50	.05 gm. post. lobe hypo.	400	1010	0	0	0
" 27	70	.05 gm. post. lobe hypo.	300	1030	+	+	1.0% D. R.

Comment.—Though not a particularly conclusive observation, nevertheless the protocol, when compared with those of the following group, shows that a pure anterior lobe defect without a concomitant posterior lobe lesion need produce little alteration in the carbohydrate assimilation limit. The injection of posterior lobe extract had the same action after operation as before—namely, the reduction of the tolerance from about 110 gms. to something below 70 gms.

This is one of the few cases where a partial removal of the gland without intentional contusion of the stalk caused a transient post-operative glycosuria, sugar being detected in only the first specimen voided after operation.

C. *Observations on the sugar tolerance of animals deprived of the posterior lobe and a fragment of the pars anterior, enough of this lobe being left for the maintenance of life.*

Removal of practically the entire gland has been shown to produce a transient lowering and subsequent rise in tolerance in the short interval before the onset of the acute terminal symptoms of glandular deficiency. Removal of a portion of the anterior lobe alone in a single case showed no subsequent increase in tolerance.

As the two following protocols will show the removal of the posterior lobe, together with only a fragment of anterior lobe—a condition not incompatible with the long maintenance of life—causes the same primary lowering of tolerance and the subsequent rise above the previously established normal.

In the second of these experiments (No. 35), the animal was kept under observation for some five months, and the persistence of the established rise in the assimilation limit is well shown, even though a portion of the pancreas had been removed before the hypophysectomy.

No. 59.—(Series of 1909-10.) *Determination of the assimilation for saccharose administered by mouth after a partial hypophysectomy including the posterior and a fragment of the anterior lobe. The usual primary post-operative decrease in tolerance was followed by a secondary rise exceeding the normal. Comparative action of hypodermic injections of posterior and of anterior lobe extracts in reducing the acquired tolerance.* (Table VI.)

TABLE VI.—TESTS OF TOLERANCE FOR CANE SUGAR BY MOUTH IN No. 59.

Date.	Grams of cane sugar given.	Dosage of glandular extract.	Urine.					
			Amt.	Sp. Gr.	Fehling.	Nylander.	Fermentation.	Polariscope.
May 17	0	....	240	1040	0	0		
" 18	60	....	360					
" 19	70	....	240	1022	0	0		
" 20	90	....	210	1020	suspic.		+	
" 21	100	....	280	1030	suspic.	0	0	
" 22	110	....	420	1022	+	+	+	
" 24	Hypophysectomy; post. lobe and fragment of ant. lobe removed.							
" 25	0	....	1750	1008	0	0	0	
" 26	0	....	2820	1006	0	0		
" 26	110	1st spec.	225		+	+	+	.6%
		2d spec.	40		++		++	2.3%
		3d spec.	610	1010	0	0		
" 27	80	1st spec.	65		+		+	
		2d spec.	425	1008	+		+	.8%
" 28	70	1st spec.	20		+		+	.1%
		2d spec.	260	1022	0		0	
" 29	60	1st spec.	15		+ sl.		+	
		2d spec.	100	1030	0	0		
" 30	50	....	220	1030	0	0		
" 31	70	....	170	1040	0	0		
June 1	80	....	220	1028	0	0		
" 2	100	....	200	1027	0	0		
" 3	110	....	170	1030	0	0		
" 4	120	....	320	1034	0	0		
" 5	130	....	210	1030	+ sl.	+ sl.	+	1.2%
" 8	130	....	200	1020	+	+	+	.3%
" 12	130	....	180	1040	+ sl.	+ sl.		1.2%
" 21	110	.05 gm. post. lobe hypo.	80	1048	+	+	+	1.5%
" 22	100	.05 gm. post. lobe hypo.	150	1040	+	+	+	.7%
" 26	100	.05 gm. ant. lobe hypo.	120	1038	0	0		
" 28	100	.1 gm. ant. lobe hypo.	100	1060+	+ sl.	+ sl.	+	1.1%

A healthy, 7.5 kilo, bitch, about nine months of age. Observed for six days previous to operation, on the usual standard diet. *Normal tolerance* established at about 100 gms. cane sugar by mouth.

May 24. Operation.—Satisfactory exposure of gland. Posterior lobe and left half of anterior lobe removed without apparent stalk injury. No operative complications.

May 25-30.—Marked post-operative polyuria (2320 cc.). No spontaneous glycosuria observed.

May 25-29.—Demonstration of greatly lowered tolerance—namely to 60 gms. or less, approximately 40 gms. below the pre-operative normal limit.

May 30-June 4.—Gradual increase of tolerance to 120 gms.

June 5-12.—Tolerance established at 130 gms. (30 gms. above normal).

June 22.—.05 gm. of posterior lobe extract hypodermically caused glycosuria with 100 gms. of cane sugar.

June 26.—.05 gm. of anterior lobe extract hypodermically caused no glycosuria with 100 gms. of cane sugar.

June 28.—0.1 gm. of anterior lobe extract hypodermically caused glycosuria with 100 gms. cane sugar, double the dose of posterior lobe extract required.

June 29-July 3.—Attempts to compare the effect of posterior lobe extract administered by mouth with the subcutaneous dosage proved ineffectual, as 0.2 gm. caused prompt vomiting of the 100 gms. of saccharose.

July 23.—Dog in good condition. Showing no symptoms of hypophyseal deficiency. Sacrificed. Autopsy conducted as usual.

Histological.—The tissue removed at operation consisted of the intact posterior lobe together with a large fragment of pars anterior. The interpeduncular block removed at autopsy showed a considerable residue of viable anterior lobe together with a small remnant of pars intermedia.

Comment.—There was an unusually high grade of post-operative polyuria in this case, and unfortunately the first voided specimens were not secured and tested for sugar. As the marked diuresis and spontaneous glycosuria usually go hand in hand, both presumably representing the introduction into the circulation of excessive amounts of posterior lobe secretion, a transient glycosuria might have been expected. However, a temporarily lowered tolerance (40 gms. below the normal) was demonstrated even to the sixth day (May 29 after the operation. Had we been making a quantitative study this would have been apparent earlier, namely, on the third day (May 16), when 110 gms. gave an abundant reduction, as it did before the operation. By the 13th day (June 5), the tolerance had risen to 130 gms. (30 gms. above the normal), where it remained about stationary for three days. It may possibly have risen to a higher level subsequently, but no further tests were made unassociated with the injection of extracts.

It can be seen that .05 gm. of posterior lobe extract administered hypodermically served to restore the post-operative tolerance practically to the former pre-operative level of 100 gms. This may therefore possibly represent the degree of secretory insufficiency of the posterior lobe. Double this amount of anterior lobe extract was needed to produce the same effect. However, as we have stated, this tolerance lowering action of pars anterior extract is in all likelihood due in large measure to the almost unavoidable incorporation of some of the pars intermedia in the preparations.

Several attempts were made to estimate the relative amounts of posterior lobe, given by mouth and administered hypodermically, in producing glycosuria with the 100 gm. doses, but the ingestion of the extract invariably caused vomiting of the sugar.

No. 35.—(Series of 1909-10.) *Determination of the assimilation limit for saccharose of an animal deprived of the posterior and a portion of the anterior lobe. Rise in assimilation limit to double the previous normal.* (Table VII.)

With the thought in mind, as indicated in our introductory paragraphs, that the alterations in carbohydrate tolerance might animals in the series were subjected to a pancreatectomy, of the gland but its duodenal attachment being extirpated. the following case as a result of this operation the usual spon- neous pancreatic glycosuria occurred, but the normal tolerance is soon regained. The hypophysectomy was performed two onths later.

December 29, 1909.—A healthy, full-grown, 7.5 kilo, dog, about year of age, was deprived of a large portion of the pancreas. pre-operative tolerance for saccharose by mouth was not lished for this individual animal but from our subsequent iences it can be approximately estimated at 80 to 90 gms.) animal made a good recovery from the anæsthetic and there no surgical complications.

BLE VII.—TESTS OF TOLERANCE FOR SACCHAROSE BY MOUTH IN No. 35.

ate.	Grams of cane sugar given, and dosage of glandular extract.	Urine.					
		Amt.	Sp. Gr.	Fehling.	Nylander.	Fermentation.	Polariscope.
29	Partial pancreatectomy, duodenal attachment remaining.						
30	0	100	1055	+ sl.	+ sl.	+	.35% D. R.
31	0	125	1050	0	0		
31	50	150	1025	0	0		
1	60	200	1030	+		+	.4% (8 gm. 24 hrs.)
25	60	120	1035	0	0		
26	70	400	1015	0	0		
27	80	200	1040	0	0		
28	90	200	1040	+	+	+	.5% D. R.
1	85	150	1035	0	0		
4	Hypophysectomy posterior lobe and large fragment anterior lobe.						
4	1st spec.	160	1050	+	+	+	
	2d spec.	600	1018	0	0		
5	50	450	1020	0	0		
7	70	375	1038	0	0		
9	80	400	1035	0	0		
11	100	140	1042	0	0		
14	140	140	1060	0	0		
16	150	450	1040	0	0		
17	160	200	1042	+ sl.		+	
27	170	60 (?)	1036	+ sl.	+ sl.	0	
28	180	320	1040	+ sl.	+ sl.	+ 1% +	
3	190	160	1052	+		+ 1%	
4	180	60 (?)	1060+	susp. +		+ v'y sl.	
5	170	130	1044	0		0	
22	120 + .05 gm. post. lobe hypo.	80 (?)	1060	+		+	3%
23	100 + .05 gm. post. lobe hypo.	150	1036	+		+	1%
24	90 + .05 gm. post. lobe hypo.	60 (?)	1048	+		+	.7%
26	80 + .05 gm. post. lobe hypo.	180	1040	0	0	0	
30	140	300 (?)	1060	0	0	0	
1	180	300	1060+	+		+	
4	160	125	1032	0	0	0	0
5	170	360	1060	0	0	0	0
9	120 + .05 gm. ant. lobe hypo.	40 (?)	1050	0	0	A few bubbles	
10	150 + .05 gm. ant. lobe hypo.	250	1020	+	+	+ 1½%	1.2%
11	140 + .05 gm. ant. lobe hypo.	80 (?)	1048	+	+	+	.4%
12	100 + .05 gm. ant. lobe hypo.	95	1040	0	0	0	0
13	120 + .05 gm. ant. lobe hypo.	140	1030	0	0	0	
15	140 + .05 gm. ant. lobe hypo.	80	1060	0	0	slight (?)	0
16	130 + .1 gm. ant. lobe hypo.	35 (?)	1060	0	0	0	
23	170	100	1058	0	0	0	0
24	180	360	1040	+	+	+	4%

cember 30.—A spontaneous glycosuria with reduction of ng's solution; positive Nylander and fermentation tests and trorotatory substance present. Though the specific gravity remained high there was no demonstrable sugar on the following day.

January 31-March 1.—Assimilation limit for saccharose rose from 60 gms. on February 1 to 90 gms. on February 28, presumably the animal's normal assimilation limit.

March 4. Operation.—Hypophysectomy with removal of posterior lobe and all but a small fragment of anterior lobe. An easy case; no surgical complications.

March 5.—Though the first specimen voided after operation showed glycosuria, 50 gms. of sugar on this date were negative.

March 7-17.—Increasing amounts of sugar failed to give glycosuria until 160 gms. led to a slight reduction—70 gms. over the pre-operative normal.

March 18-April 5.—Further rise in tolerance until 180 gms. gave faint reduction and 170 gms. proved negative.

April 22-26.—Determination of assimilation limit for saccharose, administered with a coincident hypodermic injection of 0.5 gm. posterior lobe extract, showed that glycosuria then occurred with a sugar dosage of between 80 and 90, a lowering of the established tolerance by one-half. In other words, this dose of glandular extract practically restored the pre-operative tolerance.

April 30-May 5.—Demonstration of persistence of the acquired overtolerance at about 180 gms., double the pre-operative normal.

May 9-16.—Determination of assimilation limit with coincident hypodermic administration of .05-0.1 gm. anterior lobe extract showed that this extract is much less potent in reducing the acquired tolerance than is extract of posterior lobe. In other words, 140 gms. of sugar (May 11) was necessary to give glycosuria with .05 gm. of the extract, and double this dose of extract failed to give any reducing properties with 130 gms.

May 23-24.—Demonstration of persistence for two months of acquired tolerance at about 180 gms. (double the pre-operative normal).

July 28.—Four and a half months after the hypophysectomy. Animal has remained in very good condition. Present weight 10.2 kilos—a gain of 2.7 kilos. There had been a particularly rapid gain during the period of sugar feeding, the weight on May 8 having been 11.5 kilos, a gain of 4 kilos or over 50 per cent of the original weight. Animal sacrificed.

Autopsy.—Gross examination showed the only remaining pancreatic tissue to be a small piece attached to the duodenum. There was a persistent and enlarged thymus. The adhesions between the sellar dura and infundibulum made it impossible to estimate in the gross how much of the hypophysis remained. The interpeduncular region, with the remnants of hypophysis and the dura of the sella turcica, was blocked out from the base of the brain after its removal, to be serially sectioned.

Histological.—The tissues removed at operation consisted of the intact posterior lobe and a fairly large fragment of anterior lobe, certifying the surgical procedure. A study of the serial sections of the autopsy material showed a remaining viable fragment of the anterior and of the intermediate lobes.

Comment.—This is the first of the more important observations up to which we are leading. The protocol shows what a high degree of tolerance may be established—practically twice the normal—even in an animal previously deprived of a large portion of the pancreas. It might be supposed that this preliminary operation would in itself have permanently lowered the tolerance, but as a matter of fact it seemed to play no rôle in checking the rapid increase of the assimilation limit after the hypophysectomy. Inasmuch as the supposedly normal tolerance of the animal became restored after the pancreatectomy, it would appear that the remaining fragment of the pancreas had undergone a functional compensation, in so far as the carbohydrate tolerance may be an index, or else that other members of the ductless gland series had themselves taken part in this compensation.

Following the hypophysectomy the usual transient glycosuria occurred and the animal in the course of the next four months became adipose, gaining about 50 per cent over its former weight. In these respects the effects of the operation were merely comparable to those observed in some of the series of 1908-1909 and recorded by Crowe, Cushing and Homans. However, the increase in weight in this instance was obviously accelerated during the period of sugar feeding. A similar increment in weight has often been observed during such periods of sugar feeding in both man and animals in these states of hypopituitarism.

It was demonstrated for this particular animal, after the final establishment of his high sugar tolerance, that the hypodermic administration of one-twentieth of a gm. of posterior lobe extract given coincidently with the saccharose by mouth, would lower the tolerance practically to its former normal level.[6] On the other hand, it was shown that an equal dose, by weight, of anterior lobe extract similarly administered reduced the tolerance in a slight degree, which, however, was in one way comparable to the reduction shown by the posterior lobe extract.

When it had reached its post-operative level, three weeks after the operation, the acquired high tolerance in this case remained stationary for three months, as shown by the tests on May 1 to 5, and those on May 23 and 24.

D. Effect on the sugar tolerance of removal of the posterior lobe alone.

The foregoing protocols indicate that after a nearly total extirpation of the gland, as well as after the removal of the posterior lobe with varying amounts of the anterior lobe, there occur a primary post-operative fall and a subsequent rise in the tolerance for sugar, whether administered by mouth or intravenously. The results from a single experience suggest, furthermore, that deficiency of the anterior lobe alone plays at least a relatively unimportant rôle in the ultimate acquirement of an assimilation limit exceeding the normal. It remains to report the observations on animals deprived of only the posterior lobe (pars nervosa and its epithelial investment).

Determinations of the sugar tolerance were made upon three animals after operations of this type. In one of them (No. 58) studies were made on the tolerance not only for cane sugar by mouth but also for glucose administered intravenously. In all three of the animals the characteristic post-operative rise in the assimilation limit was demonstrable. This group of cases, therefore, clearly suggests that a determining factor at least in the establishment of the high post-operative tolerance is a deficiency of posterior lobe secretion.

It will be noted that no one of these animals showed the immediate post-operative glycosuria which apparently occurs only when there is considerable traumatism of the stalk. W assume in explanation of this that a simple enucleation of the pars nervosa need not "discharge" the secretion accumulated within this structure.

No. 58.—(Series of 1909-10.) ***Determination of tolerance both for saccharose (ingested) and glucose (intravenously) after posterior lobe enucleation. Effect of hypodermic administration of posterior and anterior lobe extracts and of thyroid extract upon the increased post-operative assimilation limit for sugar by mouth.***

TABLE VIII.—TESTS OF TOLERANCE FOR CANE SUGAR FEEDING IN NO. 58.

Date.	Grams of cane sugar given.	Granular extract dosage.	Urine.				
			Amt.	Sp. Gr.	Fehling.	Nylander.	Fermentation.
June 12	0	....	80	1030	0	0	
" 13	70	....	140	1020	0	0	
" 14	80	....	80	1030	+	+	+
" 15	75	....	170	1032	0	0	
" 19-24.	Intravenous tolerance of glucose determined (cf. Table IX).						
" 25	Hypophysectomy; enucleation of posterior lobe.						
" 30	70	....	320	1008	0	0	
July 1	80	....	220	1012	0	0	
" 2	90	....	240	1012	+	+	+
" 3	0	....	160	1040	0	0	
" 7	90	....	120	1050	+	+	+
" 14	90	....	180		+	+	d'btful
" 18	90	....	180	1026	+ v'y sl.	+ sl.	0
" 20	90	....	100	1028	+		0
" 21	60	.05 gm. post. lobe hypo.	80	1030	+		0
" 22	40	.05 gm. post. lobe hypo.	100	1034	0	0	0
" 23	50	.05 gm. post. lobe hypo.	50	1042	suspic.	0	0
" 25	0	0	120	1042	0	0	0
" 29	90	....	220	1022	suspic.	0	
" 30	100	vomited.					
" 31	50	.05 gm. post. lobe hypo.	190	1030	0	0	
Aug. 3	60	.05 gm. post. lobe hypo.	100	1032	suspic.	0	0
" 4	70	.05 gm. post. lobe hypo.	40	1042	+	+	+
" 5	70	.05 gm. ant. lobe hypo.	120	1024	0	0	
" 6	80	.05 gm. ant lobe hypo.	160	1020	0	0	
" 7	70	.1 gm. thyroid hypo.	200	1024	0	0	
" 8	80	.1 gm. thyroid hypo.	90	1036	+	+	+
" 9	100	0	240	1040	+	+	+
" 10	70	.05 gm. p. l., .05 gm. a. l. hypo.	40	1042	+	+	+
" 12	50	Do.	100	1052	0	0	+
" 13	60	Do.	50	1050	+	+	

Effect also of the intravenous injection of posterior and anterior lobe extract upon the increased intravenous tolerance for glucose **(Tables VIII and IX.)**

June 12-24.—A healthy adult, 8 kilo, fox-terrier dog one year of age. Observed for 13 days previous to operation, on the usual diet. *Normal tolerance* to cane sugar by mouth established (June 12-15, Table VIII), at about 80 gms. and for glucose intravenously (June 19-23, Table IX) at 8.75 gms. 1.09

June 25. Operation.—A clean-cut enucleation of the posterior lobe, without injury to the anterior lobe or to the stalk. No surgical complications. Dog returned to cage in good condition.

First specimen of urine voided after operation showed no reduction of Fehling's solution.

June 25-29.—A moderate grade of polyuria without glycosuria (Table IX.)

---

[6] It is to be noted that animals are apt to lose weight during the administration of posterior lobe extract.

tablished at about 90 gms.

July 21.—With 60 gms. of cane sugar (30 gms. below the established tolerance) .05 gm. of posterior lobe extract administered hypodermically gave to the urine a trace of reducing substance. Though this body reduced Fehling's solution it was present in only a very small amount, for it did not cause fermentation with yeast and did not polarize.

July 22-August 3.—Negative tests with .05 gm. posterior lobe extract and coincident feeding of sugar in amounts below 60 gms.

August 4.—Posterior lobe extract (.05 gm. hypodermically) aused a glycosuria with 70 gms. (20 gms. below the tolerance) of ane sugar by mouth.

August 5 and 6.—Anterior lobe extract (.05 gm. hypo.) did not educe 70 or 80 gms. of sugar.

August 7-8.—Tests with thyroid extract hypodermically showed slight action in reducing the tolerance. The action of this ex- act was apparently less potent than was that of the anterior be and far less than that of the posterior lobe, twice as large a se being necessary to produce glycosuria with amounts almost to the level of tolerance.

August 10, 12, 13.—A combination of anterior and posterior lobe tracts proved only slightly more potent in causing glycosuria an when posterior lobe extract alone was used. Thus .05 gm. posterior lobe caused a reduction with 60 gms. and was sus- cious with 50 (July 23). A combination of .05 gm. posterior be and .05 gm. anterior lobe extract gave glycosuria with 60 s. of sugar, but none with 50. In other words, anterior lobe tract, alone or together with posterior lobe extract, had prac- ally no action in reducing the carbohydrate tolerance for cane gar taken by mouth.

Comment.—This experience demonstrates that posterior e removal alone may cause a post-operative rise in tolerance ingested saccharose—a rise, to be sure, of little more than gms. in this case and hence not so significant as in the ceding case (No. 35), in which a large part of the pituitary ly had been removed. However, it is to be noted that the re enucleation of the pars nervosa and its immediate helial investment necessarily leave much of the pars in- nedia unaffected and still capable of discharging "hyaline" way of the channels of exit for this secretion in the stalk. ice pars nervosa enucleation means in the average case of a deficit of posterior lobe (including, of course, pars rmedia) secretion than would be the case with more ex- ive manipulations, such as characterized the operation in 35.

he experience shows, furthermore, that the hypodermic inistration of posterior lobe extract is far more efficacious wering the post-operative assimilation limit than is an in- on of an equal amount of anterior lobe extract. Its ers in this direction are indeed practically equivalent to the dosage if made up of equal parts of the extracts of wo glandular subdivisions.

. 58. (Continued).—*Determination of tolerance for glucose venously (simultaneously with that for ingested cane sugar ble VIII) before and after posterior lobe enucleation. Effect f the coincident intravenous injection of anterior and pos- lobe extract upon the intravenous tolerance to glucose. operative tolerance to lævulose.*

determine whether in the same animal and under the same tions the intravenous tolerance for glucose is comparable in its behavior to the tolerance for saccharose by mouth, the following tests were made.

June 20-23.—The *normal tolerance* for glucose given intravenously was established at about 8 gms., approximately one-tenth of that for ingested saccharose.

June 25. Operation.—(Posterior lobe removal.)

June 25-29.—A moderate grade of polyuria without spontaneous glycosuria.

June 28-July 17.—Determination of post-operative intravenous tolerance. This on June 29 was 7.5 gms., slightly below the pre-operative tolerance. On July 13 and 17 it had risen to about 11 gms. or 3 gms. in excess of the pre-operative tolerance.

July 19.—The intravenous injection of 7.5 gms. lævulose caused a marked lævulosuria, equivalent to the glycosuria produced by 11.25 gms. glucose. In others words, the animal was much less tolerant to lævulose than to glucose.

TABLE IX.—TESTS OF TOLERANCE FOR INTRAVENOUS INJECTION OF GLUCOSE IN No. 58.

Date.	Dosage of extracts injected.	Grams of sugar injected.	Urine.					
			Amt.	Sp. Gr.	Fehling.	Nylander.	Fermentation.	Polariscope.
June 20	....	6.25	180		0	0		
" 21	....	7.5	200	1034	0	0		
" 22	....	8.75	170	1032	+	+	+ sl.	0
" 23	....	0	50	1034	0	0		
	Hypophysectomy (posterior lobe removal).							
" 25	....	0	1600	1003	0	0		
" 27	....	0	1180	1008	0	0		
" 28	....	6.25	150	1030	0	0		
" 29	....	7.50	70	1032	+	+	+	.3%
July 3	....	8.75	100	1030	suspic.	suspic.	0	0
" 4	....	0	160	1040	0	0		
" 5	....	0	100	1030	0	0		
" 6	....	10	80	1050	+	+	+	2%
" 11	....	10	180	1050	0	0		
" 13	....	11.25	150	1034	+	+	0	.2%
" 17	....	11.25	100	1040	+	+	+ sl.	.5%
" 19	....	7.5 gms. levulose	140	1026	+	+	+ sl.	.5% L.
" 26	.05 gm. post. lobe intraven.	6.25	160	1036	0	0		
" 27	.05 gm. post. lobe intraven.	7.50	120	1034	+	+	+	.2%
" 28	.05 gm. ant. lobe intraven.	7.50	120	1042	+	0	0	0
Aug. 14	.05 gm. ant. lobe intraven.	7.50	130	1040	+ sl.	very sl.	0	0
" 15	.05 gm. post. lobe intraven.	7	120	1040	0	0		
" 16			130	1032	0	0		

July 27.—Thirty centimeters of 25 per cent glucose solution, representing 7.5 gms. glucose introduced intravenously, simultaneously with .05 gm. *posterior lobe* extract produced glycosuria—a reduction in tolerance of about 3.5 gms. below the post-operative tolerance and 1.25 gms. below the tolerance determined before operation.

July 28.—An equal amount (7.5 gms.) of glucose intravenously, together with .05 gm. anterior lobe extract produced no glycosuria. Upon a repetition of this dosage on August 14, the urine gave an atypical reduction to Fehling's, but there was no rotation and the fermentation test was negative. Evidently pars anterior extracts were less potent than those from the pars posterior.

July 29-Aug. 13.—Saccharose ingestion tests (cf. Table VIII).

August 15.—The intravenous injection of 7 gms. glucose with .05 posterior lobe extract caused no glycosuria, establishing the tolerance lowering power of .05 gm. posterior lobe extract intravenously at about 3.5 gms. (cf. July 27), or about 31 per cent of the acquired tolerance of 11 gms.

August 25.—The animal remains in apparently perfect health. Sacrificed. *Autopsy:* Considerable glandular tissue evidently present in the sella turcica. The interpeduncular block of tissues was preserved and sectioned in the usual manner. Naked eye appearances of the other organs showed nothing noteworthy.

Histological.—The tissue removed at operation showed the intact pars nervosa and its epithelial investment. (Fig. 3.)

Serial sections of the interpeduncular block showed an intact anterior lobe with abundant and hyperplastic pars nervosa about the infundibular stalk. Gland appears collapsed, owing to enucleation of pars nervosa, and replacement of scar tissue in its bed. (Fig. 4.)

Comment.—These further observations on No. 58 illustrate that the post-operative alterations in tolerance for glucose administered intravenously are comparable with those for ingested cane sugar. The early fall and subsequent rise occur in each instance. This continuation of the protocol shows also that the coincident intravenous administration of posterior lobe extract is capable of lowering the acquired post-operative tolerance and that extract of the pars anterior is inactive or far less potent in this respect.

The tolerance for lævulose is shown to be much less than the tolerance for glucose. This, as we shall see, is important in relation to our clinical studies, for we had begun to find at this time that the ingestion of such large amounts of glucose (400 gms.) as were required to obtain the assimilation limit in many of our patients could not be retained by the stomach. It is to be noted that after excessive doses of lævulose given intravenously the reducing substance which appeared in the urine was lævo-rotatory. As we shall see, the same holds true for lævulose ingested.

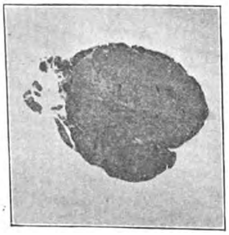


FIG. 3.—No. 58. Sections of tissue removed at operation; intact posterior lobe. Mag. 9 diams. Bensley; 5 μ; iron hæmatoxylin.

No. 64.—(Series of 1909-10.) *Determination of tolerance for ingested saccharose after posterior lobe enucleation. Increase in tolerance shown as early as 15 days after operation. Ultimate rise to 66 per cent above the normal. Effect of posterior lobe extract (hypodermically, by mouth and intravenously), of anterior lobe extract (hypodermically and intravenously) and of thyroid extract (hypodermically) upon the acquired tolerance.* (Table X.)

May 28-31.—A healthy full-grown, 7.9 kilo, fox-terrier bitch, about one year of age. Observed for five days previous to operation. The *normal tolerance* for ingested saccharose, established at something below 90 gms.

June 1. Operation.—Clean exposure of gland. Pars nervosa readily shelled out from the anterior lobe without bleeding or stalk contusion. Prompt recovery from the anæsthetic.

June 2-3.—Marked polyuria (2250 cc. in first 24 hours) without glycosuria. No post-operative complications. Animal lively and in excellent condition.

June 7-1[illegible]bohydrate tests for post-operative tolerance. On June 9, 90 gms. saccharose, the pre-operative assimilation limit failed to produce glycosuria. On June 11, 110 gms. brought dow a reducing body.

June 12-21.—Further increase in tolerance to 140 gms. (50 gms. above the pre-operative normal).

June 22-23.—One-twentieth of a gram of posterior lobe extract administered hypodermically reduced the tolerance of 140 to 11 gms. An equal dosage of anterior lobe extract with 110 gms. ga no glycosuria.

June 24-28.—With 100 gms. of saccharose given each day, an a coincident hypodermic injection of .05 gm. of *posterior lobe* extract on the first day and 0.1 gm. on the second, the animal showed glycosuria on the second day only, indicating that the reduction in tolerance depends upon the dosage of posterior lobe extract. The larger dose (0.1 gm.) of *anterior lobe* extract (for comparison with the above) did not appreciably affect the tolerance, even for amounts of sugar carried up to 120 gms.

June 29.—The administration of 0.2 gm. of posterior lobe extract by mouth, together with 110 gms. saccharose, did not cause glycosuria, showing that administration of the extract by mouth was far less effective than hypodermically.

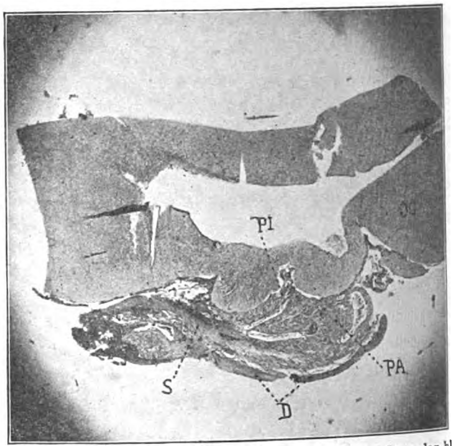


FIG. 4.—Section 41 of 5 μ series from interpeduncular block of No. 58. Mag. 9 diams. Bensley; iron hæmatoxylin. Showing intact pars anterior (P A) with scar (S) at situation of removed pars nervosa; pars intermedia (P I); sellar dura (D); optic chiasm (O G).

June 30.—An attempt to compare with the above the effect of the intravenous injection of .05 gm. of posterior lobe extract on the 100 gms. of saccharose ingested caused vomiting of the sugar. [illegible] a repetition of the test on *July 19* caused an excessive glycosuria

July 4-7. The power of thyroid extract given hypodermically in 0.1 gm. dosage was shown to be about equal to that of posterior lobe extracts in lowering the tolerance.

July 19-27.—Attempts to determine the relative dosage necessary, by the different methods of administering the extract, [illegible] produce glycosuria with a given amount of saccharose ingested. The extract when administered intravenously was more than twice as potent as when given hypodermically, and by the *latter* method was more than eight times as potent as when taken by mouth.

July 29-August 1.—Observations on the effect of the injection of equal parts of anterior and posterior lobe extracts in 0.1 gm. doses suggested that there might possibly be an antagonistic action; for .05 gm. of posterior lobe extract given alone would have been expected to show glycosuria with the 130 gms. of sugar in view of the earlier reactions (e. g. June 22), even making allowance for the increment in tolerance between June 23 and August determined for June

LE X.—Tests of Tolerance for Saccharose Injected in No. 64.

ıte.	Grams of cane sugar given.	Glandular extracts used.	Urine.					
			Amt.	Sp. Gr.	Fehling.	Nylander.	Fermentation.	Polariscope.
28	0	....	130	1044	0	0		
29	80	....	160	1050	0	0		
30	90	....	120	1032	+	+	+	
31	0	....	180	1030	0	0		
e 1	Hypophysectomy; posterior lobe removed.							
2	0	....	2550	1004	0	0		
3	0	....	500	1010	0	0		
7	70	....	140	1044	0	0		
8	80	....	200	1044	0	0		
9	90	....	160	1030	0	0		
10	100	....	140	1038	0	0		
11	110	....	120	1044	slight	faint	+	1.4%
12	0	....	140	1036	0	0		
13	0	....	80	1040	0	0		
14	110	....	140	1060	0	0		
15	120	....	260	1032	0	0		
16	130	....	160	1036	+ sl.	+ sl.	+	1.3%
17	0	....	140	1034	0	0		
18	0	....	100	1042	0	0		
19	130	....	180	1050	0	0		
20	0	....	200	1038	0	0		
21	140	....	100	1050	+ sl.	+ sl.	+ sl.	.3%
22	110	.05 gm. post. lobe hypo.	120	1040	+ sl.	+ sl.	+	.6%
23	110	.05 gm. ant. lobe hypo.	250	1028	0	0		
24	100	.05 gm. post. lobe hypo.	210	1022	0	0		
25	100	.1 gm. post. lobe hypo.	100	1044	+	+	+	.5%
26	100	.1 gm. ant. lobe hypo.	180	1032	0	0		
27	110	.1 gm. ant. lobe hypo.	270	1018	0	0		
28	120	.1 gm. ant. lobe hypo.	320	1020	0	0		
29	110	.2 gm. post. lobe by mouth.	540	1020	0	0		
30	100	.05 gm. post. lobe intraven.	Sugar regurgitated.					
4	100	.1 gm. thyroid ext. hypo.	Sugar regurgitated.					
5	100	.1 gm. thyroid ext. hypo.	180	1046	+	+	+	1.4%
7	90	.1 gm. thyroid ext. hypo.	120	1026	+	+	+	1.0%
19	100	.05 gm. post. lobe intraven.	450	1028	++	+	+	2.6%
24	80	.1 gm. post. lobe hypo.	560	1013	0	0		
25	90	.1 gm. post. lobe hypo.	380	1028	+	+	+ sl.	.1%
6	80	.1 gm. thyroid ext. hypo.	560	1016	+	+	+ sl.	0
7	110	.4 gm. post. lobe by mouth.	300	1030	+	+	+	.4% R.
8	110	0	420	1012	0	0		
9	110	.05 gm. a. l., .05 gm. p. l.. intraven.	260	1016	0	0		
0	120	.05 gm. a. l., .05 gm. p. l., intraven.	420	1020	0	0		
1	130	.05 gm. a. l., .05 gm. p. l., intraven.	260	1024	+	+	+	1.2%
	0	0	120	1018	0	0		
	140	0	140	1030	0	0		
	150	0	160	1034	+	+	+	1.2%

had risen to about 150 gms., or 60 gms. over the pre-
ive normal—an increase in the assimilation limit of 66
t.

Autopsy: conducted in the usual manner.

Histological.—Sections of the fragment removed at operation (Fig. 5), showed pars nervosa with its investment practically intact. Serial sections of the interpeduncular block showed an intact and viable anterior lobe (Fig. 6), with patches of hyperplastic intermediate lobe cells adjoining the stalk and remains of the cleft. The open space from which the posterior lobe was enucleated was apparent.

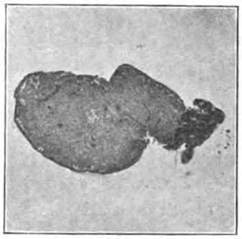


Fig. 5.—No. 64. Section of tissue removed at operation; practically intact posterior lobe. Mag. 9 diams. Bensley; 5 μ; iron hæmatoxylin.

Comment.—This experience likewise demonstrated a gradual increase in the sugar tolerance after posterior lobe removal until it reached 66 per cent above the normal established before the operation. The absence of spontaneous post-operative glycosuria is again to be noted, for there was no stalk traumatism. Tests of the effects of various glandular extracts brought out the following points: that .05 gm. of posterior lobe extract given subcutaneously lowered the acquired assimilation limit of 140 gms. for ingested saccharose to less than 110 gms., a decrease of 21 per cent; that double this dose of posterior lobe extract brought it down to less than 100 gms., a decrease of about 29 per cent; that equivalent doses of anterior lobe extract given subcutaneously, even with larger doses of sugar, had no comparable tolerance-lowering effect. Thyroid extract, on the other hand, given under the skin likewise, had an equal if not a more potent effect than posterior

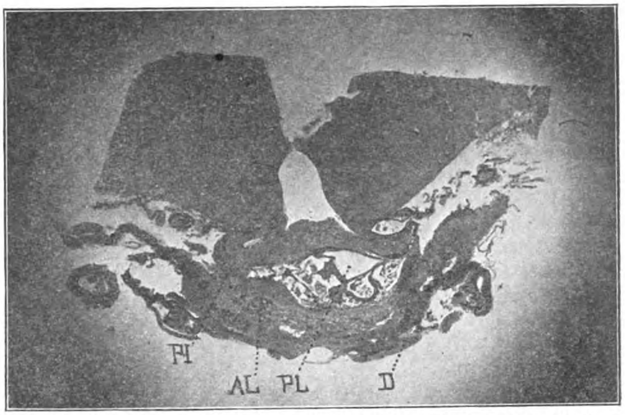


Fig. 6.—Section 22 of 5 μ series from interpeduncular block of No. 64. Mag. 9 diams. Bensley; H and E. Showing space filled with partially organized reticular tissue from which posterior lobe was removed (P L); intact anterior lobe (A L); pars intermedia (P I); enveloping dura (D).

lobe extract in this particular animal (not confirmed in No. 67).

Further tests with extracts in this animal showed, as might have been expected, that posterior lobe extract given intravenously is far more effectual than when given under the skin, and that the latter method is in turn far more effectual than when the extract is given by mouth, the relative potency being roughly in the proportion of one to four to thirty-two. This is of some importance in relation to methods of administering the extract for therapeutic purposes.

No. 67.—(Series of 1909-10.) *Determination of the assimilation limit for ingested saccharose after posterior lobe extirpation. Lowered tolerance for nine days; normal tolerance regained on the 12th day; subsequent rapid increase by the third week to 46 per cent above the normal. Tolerance reduced by the administration of posterior lobe extract but not by anterior lobe extract.* (Table XI.)

June 10-14.—The normal assimilation limit for ingested cane sugar in a 7 kilo puppy dog about 10 months of age, was established at something below 75 gms.

June 15. Operation.—A clean-cut posterior lobe removal; the anterior lobe and stalk remaining undisturbed. No complicating factors. The animal stood the procedure well and remained in good condition until sacrificed two months later.

June 15-16.—High grade of polyuria following operation, the first 24-hour amount being 3700 cc. No spontaneous glycosuria in first specimen.

June 18-19.—Glycosuria appeared with 50 gms. saccharose (25 gms. below the normal). Forty grams gave no reducing substance. Tolerance therefore on this third day after operation had fallen 33 per cent.

June 22-23.—Fifty grams no longer gave glycosuria, but it occurred with 60 gms.

June 27-July 7.—Eighty grams were needed to give glycosuria on June 27; 100 gms. on July 1, 110 gms. on July 5, showing the rapid post-operative acquirement of this relatively high assimilation limit. It is presumable that there was a further rise, but no subsequent tests uncomplicated by extracts were made. (The positive reaction with only 100 gms. on August 6th was possibly associated with a prolonged action of the thyroid extract given the day before.)

July 14-August 5.—This interval was consumed in making tests with extracts to determine their relative potency in lowering the raised assimilation limit. The results were somewhat less striking than those shown in No. 64. A coincident subcutaneous injection of .05 gm. posterior lobe extract with 50 gms. saccharose (July 19) gave glycosuria, and again with 40 gms. (July 23)—a lowering of the established assimilation limit therefore by considerably more than half. An equal dose of the extract given intravenously (July 26) gave glycosuria with 30 gms., lowering the established tolerance over 70 per cent.

The injection of anterior lobe extract likewise in .05 gm. dosage had a somewhat less striking effect, but nevertheless gave traces of a reducing substance with amounts of sugar as small as 60 gms.—a lowering of the tolerance about 45 per cent.

The combined action of equal parts of anterior and posterior lobe extracts in .05 gm. doses (July 30-August 3) had if anything less potency than the posterior lobe extract alone.

Double the standard dose of thyroid extract (namely, 0.1 gm.) gave glycosuria with 60 gms. but not with 50 gms. (August 4-5), being, therefore, far less active than posterior lobe extract, in this particular case.

August 8.—The animal remains in apparently perfect health. Sacrificed. *Autopsy:* Conducted as usual, gross examination the organs disclosing nothing of special note.

TABLE XI.—TESTS OF TOLERANCE FOR INGESTED SACCHAROSE I No. 67.

Date.	Grams of cane sugar given.	Glandular extracts administered.	Urine.					
			Amt.	Sp. Gr.	Fehling.	Nylander.	Fermentation.	[illegible]
June 10	0	....	100	1030	0	0		
" 11	80	....	270	1026	+	+	+	[illegible]
" 12	70	....	240	1030	0	0		
" 13	75	....	220	1020	+	+		
" 14	0	....	100	1050	0	0		
" 15	Hypophysectomy; removal of posterior lobe.							
" 15	0	....	3700	1004	0	0		
" 16	0	....	2150	1004	0	0		
" 17	0	....	340	1020	0	0		
" 18	50	....	440	1016	+	+	+	[illegible]
" 19	40	....	450	1020	0	0	0	0
" 20	50	....	470	1020	+ sl.	+ sl.	0	0
" 22	50	....	310	1020	0	0		
" 23	60	....	420	1018	+	+	+	[illegible]
" 24	50	....	360	1020	0	0		
" 27	80	....	450	1012	+	+	+	[illegible]
" 29	80	....	440	1018	0	0		
" 30	90	....	500	1008	0	0		
July 1	100	....	440	1022	susp. +	+ sl.	+	[illegible]
" 4	100	....	80	1052	0	0		
" 5	110	....	340	1020	+	+	+	[illegible]
			60	1034	0	0		
" 7	110	....	340	1022	+	+	+	[illegible]
" 14	90	.05 gm. post. lobe hypo.	130		+	+	+	[illegible]
" 15	70	.05 gm. post. lobe hypo.	80		+	+	slight	[illegible]
" 18	60	.05 gm. post. lobe hypo.	150	1055	+	+	+	[illegible]
" 19	50	.05 gm. post. lobe hypo.	110	1052	+	+	+ sl.	[illegible]
" 20	70	.05 gm. ant. lobe hypo.	80	1020	+	+	+	[illegible]
" 21	70	.05 gm. ant. lobe hypo.	180	1020	+	+	+	[illegible]
" 22	30	.05 gm. post. lobe hypo.	140	1044	0	0	0	0
" 23	40	.05 gm. post. lobe hypo.	70	1054	+	+	+	[illegible]
" 24	60	.05 gm. ant. lobe hypo.	150	1040	+		0	0
" 25	50	.05 gm. ant. lobe hypo.	150	1042	atypical	0	0	[illegible]
" 26	30	.05 gm. post. lobe intraven.	80	1048	+ susp.	+ sl.	+ sl.	[illegible]
" 27	60	.05 gm. ant. lobe hypo.	120	1030	+	+	+	[illegible]
" 28	40	.05 gm. ant. lobe hypo.	80	1046	atypical	atypical	0	
" 29	30	.05 gm. ant. lobe hypo.	100	1028	0	0	0	0
" 30	50	.05 gm. a. l., .05 gm. p. l., hypo.	90	1050	+	+	+	[illegible]
Aug. 1	40	.05 gm. a. l., .05 gm. p. l., hypo.	130	1034	0	0	0	0
" 8	50	.05 gm. a. l., .05 gm. p. l., hypo.	110	1034	+	+	slight	[illegible]
" 4	50	.1 gm. thyroid hypo.	70	1048	0	0		
" 5	60	.1 gm. thyroid hypo.	60	1052	+	+	+	[illegible]
" 6	100	0	440	1024	+	+	0	[illegible]
" 7	90	0	400	1024	0	0		

Histological.—The tissue removed at operation (Fig. 7) consists of the intact posterior lobe with its epithelial investme confirming the operative note. Serial sections of the inte peduncular block removed post mortem showed the viable and tact anterior lobe with hyperplastic pars intermedia adjoining th

Comment.—This protocol gives another example of the aracteristic temporary lowering of the assimilation limit · ingested cane sugar after posterior lobe removal and the osequent rapid rise (to 46.6 per cent) in excess of the pre-erative normal limit.

The various tests with glandular extracts, to determine their ative potency in lowering the degree of acquired tolerance, : again recorded. They show that posterior lobe extract the most efficacious, for in this instance it lowered the ac-ired high tolerance far below the original normal. Anterior)e extract was somewhat less effective, thyroid extract still s so. It is quite apparent, however, that in this animal all :ee extracts showed a greater potency than usual; and to ve made the tests of actual value the extracts should have ən tried out on the animal's normal tolerance before the eration.

Summary of Experimental Data.

The matter of primary interest to which we would call atten-n is the increase in the assimilation limit for sugar, whether gested or given intravenously, in experimentally produced tes of hypophyseal deficiency. This acquirement of an over-erance for carbohydrates we feel justified in attributing to a

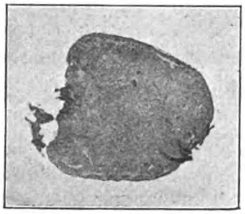


Fig. 7.—No. 67. Section of tissue removed at operation; ntact posterior lobe. Mag. 9 diams. Bensley; 5 μ; iron æmatoxylin.

ɪrivation of posterior lobe (pars nervosa and pars inter-lia) activity.

That operative manipulations of the gland cause a marked :urbance of the sugar storing function is shown by the juency with which transient spontaneous glycosuria occurs ·r operations of a certain type—namely, ones which e necessitated a certain degree of traumatism of the in-dibular stalk and its enveloping epithelium (pars inter-lia). Such operations as do not require stalk manipula-, a clean-cut posterior lobe enucleation for example, ılly fail to show this immediate post-operative glycosuria, :h therefore can hardly be attributed to the anæsthetic.

:istological studies have shown that the stalk of the hypo-is and the floor of the third ventricle immediately ad-nt to it contain, under all circumstances, a substance—ring's "hyaline bodies"—which may be regarded as the tory product of the posterior lobe. This material appears ıd its way into the infundibular cavity, and the cerebro-l fluid has been shown to contain a substance having the

fluid has an active circulation and in all probability finds its way into the blood stream. It consequently is a natural explanation of the phenomenon of spontaneous glycosuria that in the manipulations of the tissue holding this material an excessive amount of posterior lobe secretion, thus suddenly set free, enters the circulation and thus accounts for the glycosuria. We have found, indeed, that, without injuring or removing the body of the gland, the mere crushing of the stalk by the placement on it of a silver "clip" for the purpose of producing a permanent stasis of the products of posterior lobe secretion, will usually lead to a temporary glycosuria, the procedure being in this respect equivalent to a total removal.

We assume that the spontaneous glycosuria represents a hyperglycæmia from the discharge of stored glycogen which has been set free by the introduction into the circulation (by way of the cerebrospinal fluid) of the posterior lobe secretion

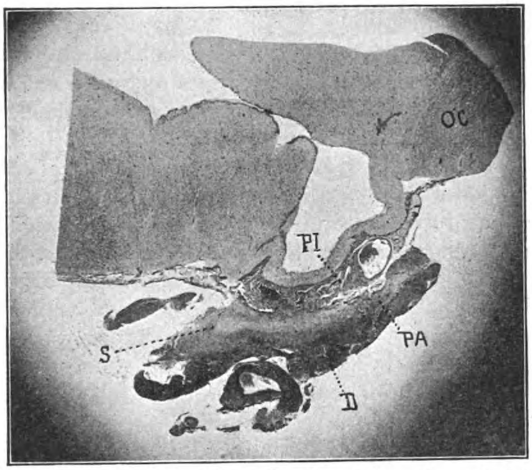


Fig. 8.—Section 37 of 5 μ series from interpeduncular block of No. 67. Mag. 9 diams. Bensley; 5 μ; hæmatoxylin and eosin. Showing pars anterior (P A); hyperplasia of pars intermedia (P I) with colloid cysts; scar tissue (S) replacing posterior lobe cavity; dural envelope (D); optic commissure (O C).

accumulated in the infundibular tissues. We have obtained additional support for this view from some further (unpublished) observations concerning the effects of injections of concentrated cerebrospinal fluids on the carbohydrate assimilation limit of dogs and rabbits.

Preliminary determinations of the tolerance shown by the unoperated animals gave an average assimilation limit for saccharose by mouth of about 10 gms. per kilo of body weight, and for glucose intravenously roughly about one gram per kilo. A marked augmentation—occasionally to double the normal—in the tolerance for sugars administered in either of these ways was an end result of all the hypophysectomies provided the posterior lobe was included with the glandular tissue removed.

---

[7] Cushing and Goetsch: Concerning the secretion of the infundibular lobe of the pituitary body and its presence in the cerebrospinal fluid. Am. J. Physiol., 1910, XXVII, p. 60.

Though our studies on the influence of various glandular extracts in lowering the assimilation limit in these states of experimentally acquired high tolerance are rather a side issue, nevertheless the fact that posterior lobe extract proves to be an agent especially potent in bringing about a lowered degree of tolerance brings support to the assumption that we are dealing primarily with a deficiency of the posterior lobe.

It may be noted here that attention was called in the report by Crowe, Cushing and Homans to the rapid emaciation which follows repeated injections of posterior lobe extract, due, as they conjectured, to an active tissue oxidation. There was presumably a marked unloading of stored carbohydrates, and glycosuria was occasionally observed in their animals. Here, on the other hand, in these states of experimental glandular deficiency, there seems to be a lowered tissue metabolism, manifested by a tendency to subnormal temperatures and to the acquirement of adiposity. An especial rise in the weight curve often occurs coincident with the period of forced sugar feeding.

Needless to say, in order to have made these observations on the effect of glandular extracts more conclusive we should have determined their influence in each case on the normal tolerance as established before the operation.

The attempts to determine the relative efficiency of administering posterior lobe extract by mouth, by subcutaneous injection, and intravenously, showed that about one-twentieth of a gram subcutaneously would have a definite effect on the acquired tolerance of the animal. To obtain the same result it required, by a rough estimate, about one-fourth of the dose when given intravenously and eight times the dose when given by mouth. These data are of some therapeutic importance in relation to the studies on the clinical cases to follow.[8]

IV. THE SUGAR TOLERANCE IN CLINICAL DYSPITUITARISM.

Our experimental studies had indicated that a deficiency of posterior lobe secretion would lead to an increased tolerance for carbohydrates and that the administration of posterior lobe extract could markedly lower the acquired high assimilation limit. It was a natural conjecture that, could we demonstrate the existence of similar reactions toward the carbohydrates in the clinical cases of pituitary disease which were under our care, we might possibly have a means of determining whether there was a state of over or under glandular activity, at least so far as the posterior lobe was concerned.

Methods of estimating the tolerance.—We have unfortunately received but little help from earlier studies, for though it has been roughly estimated that the normal human assimilation for glucose by mouth is about 150 gms., and for lævulose about 100 gms., we have found no figures as to the average sugar tolerance for man in relation to body weight. In the canine, as will be recalled, certain approximate standards for the normal were found—namely, about 10 gms. of ingested cane sugar per kilo of body weight and about one gram per kilo for glucose administered intravenously. These proportions, of course, were not expected to hold true for man; and if they did, such enormous doses of sugar would be required as to make their administration out of the question. As it was, we experienced difficulties, even though carbohydrates are appetizing to these individuals almost without exception.

We began our observations with the simple administration of glucose usually given on an empty stomach about five hours after the evening meal, all subsequent specimens of urine being separately saved. In many of the cases the tolerance for glucose was so great that we were never able to determine the actual assimilation limit, vomiting the sugar taking place in spite of all precautions and devices such as disguising the taste, giving divided doses and the like. We have had individuals take and retain 400 gms., as the following records of sugar feeding will show, but this is exceptional, and when the assimilation limit was very high we were usually forced to desist from our efforts to determine it by ingestion methods.

A personal experience has shown us that the stomach may rebel even at the relatively small doses required to determine the assimilation limit for presumably normal states, and it takes gastric courage for patients to consume two or three times this amount.

We have done better with lævulose, and it is our impression from one or two experiences with individuals (Cases XIII and XVI), whose stomachs tolerated the sugars well, that only about half the bulk needed with glucose is required to reach the assimilation limit with lævulose. It is of interest that, as in the animal experiments, the excess of lævulose absorbed from the intestine appears unconverted as lævulose in the urine. It may be recalled that Strauss[9] regards the occurrence of lævulosuria after the ingestion of amounts below 1 gms. as an evidence of hepatic insufficiency. The assimilation of three times this amount in some of our cases would seem to indicate an extraordinary storage capacity for glycogen.

A rough estimate might place the average human assimilation limit for ingested glucose in a 70 kilo individual at something over 140 gms. of glucose, or about two grams per kilo of body weight, only a fifth of the canine tolerance; and for lævulose at about 100 gms. or 1.4 gms. per kilo. Though the majority of our cases of hypopituitarism with high grades of sugar tolerance had become adipose, nevertheless the comparative increase in the tolerance limit per body weight was extreme, in many running up to three and even four or five gms. of glucose per kilo.

One interesting result of the consecutive carbohydrate tests to which we have subjected these generously co-operating patients has been the rapid increase in weight coincident with the sugar administration. A similar effect was noted with the canine feedings. It is to be remembered, at the same time, that the observed individuals, experimental or clinical, usually

---

[8] We desire to express our obligations to Mr. F. M. Bell of Armour & Company for his generous co-operation in supplying us with the powdered preparations of posterior lobe which have been used in these experiments.

[9] H. Strauss: Zur Funktionsprüfung der Leber. *Deutsche med. Wchnschr.*, 1901, XXVII, p. 757.

[illegible] powers are at a low ebb and that the stored glycogen is transformed into fat. In the brief abstracts which we have given of the experiments we could not go with any detail into the histological studies of the other ductless glands, though it may be said in passing that the general features of the changes throughout the whole body consist n a striking deposition of fat within the cells.

The experimental subcutaneous administration of posterior obe extract in repeated doses appears to bring about the reverse picture—namely, excessive emaciation—and, as we have een, small individual doses serve to lower either the normal ugar tolerance or the high tolerance succeeding posterior obe removal. This suggests, of course, a ready means of deermining the tolerance for ingested sugars in clinical cases. Thus, coincident with the administration by mouth of an amount of sugar which would represent the presumed normal olerance according to the body weight, the dosage of the extract necessary to produce a transient glycosuria can be deermined (cf. Case XIII). This, however, requires further nvestigation and better methods of administration, for the ubcutaneous or intermuscular injection even of one-twentieth of a gram of the boiled extract suspended in 2 cc. of fluid is apt to produce an uncomfortable point of tenderness, and in one patient caused a local amicrobic abscess.

Tolerance in Acromegaly and Gigantism.—It has been known for a number of years that a spontaneous glycosuria is a not uncommon accompaniment of acromegaly, a malady in which hypophyseal overactivity has been assumed by many. Indeed, attention has been called to the fact that a lowered assimilation limit may be associated with pituitary lesions in the absence of any clinical manifestations of acromegaly. An nteresting illustration of this had been given in one of our own cases observed before we began these experimental studies on sugar tolerance. The patient, who exhibited certain obcure cerebral symptoms thought to be of vascular origin, was egarded at first as the subject of diabetes mellitus, and subsequently, as the glycosuria disappeared and marked polyuria ersisted, as a case of diabetes insipidus. At autopsy a year r two later a gumma of the anterior lobe was disclosed. Our resent interpretation of the case would be that the lesion had timulated the pars nervosa into an abnormal activity.

Other examples of spontaneous glycosuria which we are inined to attribute to a pituitary body lesion rather than to the psetting of a cerebral "sugar-center" might be given. We e inclined to the view that the fleeting glycosurias which ccompany certain bursting fractures of the cranial base are f this nature, for the line of fracture usually seeks out the iddle cranial fossa and may readily traumatize the pituitary ody itself.

However, in none of the twenty cases of acromegaly or gantism which have occurred in our personal series, has ere been a coincident spontaneous glycosuria. The reason r this doubtless lies in the fact that the cases have been en late in the progress of the disease. In all probability had e urine been examined at a sufficiently early stage, glyco-

tected. In one instance, indeed, the patient had failed to pass a life insurance examination some years before, as he was supposed to be suffering from diabetes, though at the time of his admission to our care an abnormally high assimilation limit was present.

It is presumable that the syndromes of acromegaly and gigantism primarily represent states of hypophyseal, and as we believe of anterior lobe overactivity, it being a natural conjecture that the posterior lobe meanwhile is functionally stimulated. As the disease progresses and the pituitary struma forms (whether it be a simple hyperplasia, a cyst or "malignant adenoma") a condition of glandular insufficiency results and states comparable to those seen in the animals with experimentally defective glands are superimposed. In other words, there appears to be, at least for such outspoken states of hyperpituitarism as we have up to this time come to recognize clinically (represented by acromegaly and gigantism), an inevitable tendency for them to be transformed ultimately into states of hypopituitarism.

The case reports will be given in the greatest brevity, for all that we wish to show is the high degree of carbohydrate tolerance acquired by these patients. In a few instances sufficient doses of posterior lobe extract have been given to produce glycosuria with amounts of sugar below the established assimilation limit.

We have subdivided the acromegalies into separate groups according to the duration of the symptoms. In only one of these patients (Case I) was the condition recent and acute, possibly of not more than a year's duration. A subnormal tolerance was present, namely 1.4 gms. of glucose per kilo of body weight.

CASE I.—No. 25827. *April 25, 1910.* (Acromegaly.)—Male, aged 33, weight 72 kilos (160 lbs.). Urine, high specific gravity; no sugar.

May 1.—Glucose 100 gms. Glycosuria on first three specimens.

May 5, 6, 7.—Glucose in 25, 50 and 75 gm. doses respectively gave no reducing body.

May 8.—Glucose 100 gms. gave glycosuria on first specimen.

In the following case the symptoms were of about four years' duration and were not particularly outspoken. The patient was not fat. The tolerance was about normal, approximately 150 gms. or 2 gms. of glucose per kilo of body weight.

CASE II.—No. 27247. *January 10, 1911.* (Acromegaly.) Male, aged 40, weight 73 kilos (162 lbs.).

January 15 and 17.—Glucose 100 gms. gave an atypical, and 150 gms. a strong reduction to Fehling's.

January 22 and 23.—Lævulose 100 gms. gave an atypical, and 150 gms. a strong reduction to Fehling's.

January 25.—Lævulose 100 gms. with 0.4 gm. post. lobe ext. gave a strong reduction.

The disease in the two succeeding patients, both females, was of about five and eight years' duration respectively, judging from the onset of the amenorrhœa. They were tested only with lævulose, for which they showed a fairly high tolerance, 1.7 gm. per kilo in the first and 2.4 gms. per kilo in the second case. There were no posterior lobe injections.

Case III.—No. 27256. *January 23, 1911.* (Acromegaly.) Female, aged 37, weight 84 kilos (188 lbs.).

January 24.—Lævulose 100 gms. gave an atypical reduction.

January 25.—Lævulose 150 gms. gave a positive reduction in a single specimen nine hours after ingestion.

Case IV.—No. 27290. *February 1, 1911.* (Acromegaly.) Female, aged 35, weight 66 kilos (148 lbs.).

February 4.—Lævulose 150 gms. gave an atypical reduction in first two specimens.

February 5.—Lævulose 175 gms. gave a positive glycosuria in first two voidings seven and nine hours later.

The three following cases were of longer duration. The first had progressed rapidly during a period of about four years and showed pronounced neighborhood symptoms due to a "malignant adenoma" of the pars intermedia (?). The assimilation limit for ingested glucose was never fully determined, but it was over 5 gms. per kilo of body weight.

The second was a slowly progressive case of 13 years' duration, with a small gland and no neighborhood pressure symptoms. The sugar tolerance for glucose was 3 gms. per kilo of body weight.

The third was a case of about six years' duration, associated with an intrathoracic goitre. This had caused disturbing pressure symptoms, and the patient in the past few months had lost the 50 pounds in excess of his previous normal weight which he had put on since the onset of the disease. His tolerance for glucose could not be established, but it was enormous and possibly over 5 gms. per kilo of body weight.

Case V.—No. 25971. *May 1, 1910.* (Acromegaly.) Female, aged 28, weight 64 kilos (142 lbs.).

May 6.—Glucose 300 gms. in divided doses gave an atypical reduction.

May 14.—Glucose 250 gms. with 0.1 gm. post. lobe ext. subcutaneously gave a positive reduction (1.5 per cent dext. rotatory).

May 16.—Lævulose 100 gms. gave no reduction.

May 19, 22 and 24.—Glucose in 100, 200 and 300 gm. doses respectively gave no glycosuria. Larger doses were not retained.

Case VI.—No. 26210. *July 6, 1910.* (Acromegaly.) Male, aged 40, weight 85 kilos (191 lbs.).

July 6 and 7.—Glucose 100 gms. and 200 gms. respectively was negative.

July 8.—Glucose 300 gms. heavy reduction.

July 9.—Glucose 250 gms. slight reduction with first voided specimen.

Case VII.—No. 25977. *May 21, 1910.* (Acromegaly.) Male, aged 59, weight 70 kilos (156 lbs.).

July 2.—Glucose 200 gms. 10 a. m., and 200 more 10 p. m., gave no reduction.

July 4.—Glucose 300 gms. in one dose gave no reduction.

July 6 and 7.—Glucose in 400 gm. amounts vomited on each trial.

The three following cases belong in the group of acromegalic giants or actual gigantism. The increase in height was not marked in the first patient who in many respects was a typical example of acromegaly, beginning in about the 22d year of life. There were no neighborhood symptoms. The second patient was a huge acromegalic giant with an enormous gland, causing blindness; and the third was a typical giant, with a huge sella turcica, the symptoms dating from childhood. These individuals were naturally very heavy, but nevertheless the tolerance in terms of body weight was above normal. In the first case it was 2.2 gms. per kilo; in the second and third it could not be established, but was shown to be something over 2.6 gms. per kilo.

Case VIII.—No. 26068. *June 8, 1910.* (Acromegaly.) Male, aged 42, weight 90 kilos (200 lbs.).

June 9, 10 and 11.—Glucose in 100 gm., 150 gm. and 175 gm. doses respectively gave no glycosuria.

June 13.—Glucose 200 gms. gave a positive reduction of 0.4 per cent by the polariscope.

Case IX.—No. 27045. *December 10, 1910.* (Acromegalic giant.) Male, aged 35, weight 116 kilos (257 lbs.), height 197 cm. (6 ft. 6 in.)

December 12.—Glucose 200 gms. negative.

December 14.—Glucose 200 gms. with 0.2 gm. ant. lobe ext. subcutaneously, negative.

December 15.—Glucose 300 gms. with 0.4 gm. ant. lobe ext. subcutaneously, negative.

December 16, et seq. Patient unable to retain amounts over 300 gms. Tolerance not established. Lævulose not tried. An increase of five pounds in weight during the 5 days of sugar feeding.

Case X.—No. 25947. *May 15, 1910.* (Gigantism.) Male, aged 36, weight 134 kilos (276 lbs.), height estimated at 7 ft. 6 in.

May 20, 23, 28 and 30.—Glucose 100 gms., 200 gms., 275 gms. and 300 gms. respectively gave no glycosuria. Subsequent trials with amounts over 300 gms. were vomited. Actual assimilation limit for glucose not reached. Lævulose not tried.

June 12.—Glucose 175 gms. with 0.1 gm. post. lobe ext. subcutaneously gave no reduction.

June 13.—Glucose 250 gms. with 0.1 gm. post. lobe ext. subcutaneously gave no reduction.

Further tests omitted owing to discomfort from the injections.

These 10 examples, therefore, of outspoken acromegaly or gigantism, representing conditions which we attribute to primary anterior lobe hyperplasias, have shown gradations in tolerance varying from something below 100 gms. of ingested glucose to amounts possibly far in excess of 400 gms. Had we been fortunate enough to have observed a patient in the very early stage to which, presumably, spontaneous glycosuria is largely confined, the series, from the standpoint of sugar tolerance, would have been complete. Assuming as we do at present that the disturbed limits for sugar assimilation are associated in large part, if not solely, with posterior lobe lesions, it is conceivable that the malady might run its course without seriously disturbing the carbohydrate tolerance—in other words, without inciting the primary increase and subsequent decline of posterior lobe activity.

Step by step with the acquired increase of sugar tolerance shown by these patients, other symptoms which we attribute to deficiency of glandular activity become more or less prominent—general weakness and drowsiness, a subnormal temperature, a low blood pressure, amenorrhœa or impotence, and above all, the adiposity already commented upon. The acquired power of storing carbohydrates is, in other words, merely one of many clinical manifestations of glandular (posterior lobe) insufficiency, but it furnishes a clinical test by means of which it is possible to estimate in a measure the stage at which the malady has arrived, and it may therefore

Tolerance in States of Primary Hypopituitarism.—Of more nterest than the foregoing group of cases are those in which here has been from the outset a deficiency of posterior lobe ctivity. They are of greater moment also, for they have been videly overlooked. In their most striking form these various onditions of hypopituitarism are brought about (1) by direct ressure upon the infundibular stalk by interpeduncular umors, often having a congenital anlage; (2) by direct in- olvement of the posterior lobe in a growth originating in the land itself, or (3) by the distant effect of a tumor causing an bstructive hydrocephalus and thus damming back the fluid nedium carrying the posterior lobe secretion.[10]

As the following data abstracted from our case histories vill show, we have had numerous opportunities for testing he sugar tolerance of patients afflicted with the lesions comrised in the first two of these three subdivisions. The same ymptoms of hypopituitarism that we have recounted above as ccurring late in acromegaly, under these circumstances apear as the primary manifestations of the malady—adiposity eing one of the most striking features. The presence of an nterpeduncular or pituitary tumor in many of these 11 cases o be recorded was certified by operation or autopsy or else by he existence of definite neighborhood symptoms which, aided y the X-ray rendered the diagnosis beyond dispute.

Only one of these patients showed a subnormal assimilation imit. This was a mixed case in which a large infundibular umor was associated with suggestive acromegalic changes in he bones of the hands, marked adiposity (the weight being 13 lbs.), and a low tolerance for ingested glucose, on a single est 100 gms. giving a positive glycosuria. The condition was ne for which no adequate explanation offered itself, except n the basis of an overactive anterior lobe combined with an nderactive posterior lobe. At autopsy a year later the gland, ough intact, was found to be somewhat compressed by the rowth, which had greatly elongated the stalk and had doubtss obstructed the posterior lobe secretion.

The typical cases of primary hypophyseal tumor showing no ace of acromegaly which have occurred in our series and hich have had their sugar tolerance estimated are as fol- ws. In the first two cases the tolerance for ingested glucose one was determined. Both were patients with pronounced ighborhood symptoms. The assimilation limit of 400 gms. the second case was particularly high, in view of the body ight, namely 5.7 gms. per kilo.

noma.") Male, aged 36, weight 88 kilos (195 lbs.).

April 26.—Glucose 100 gms. negative.

April 27.—Glucose 200 gms. positive; 1.2 per cent dext. rotatory.

April 29.—Glucose 100 gms. with 0.1 gm. post. lobe ext. gave glycosuria.

May 1. Operation.—Partial tumor extirpation. Subsequent increase in weight.

May 23, June 4, June 5, June 7, June 8.—Glucose in doses of 100 gms., 150 gms., 175 gms., 200 gms. and 225 gms. respectively gave no glycosuria. Larger doses were not retained by the stomach, so that the *ultimate tolerance* was only roughly estimated at something over 2.6 gms. glucose per kilo of body weight.

CASE XII.—No. 26634. *September 26, 1910.* (Hypophyseal tumor.) Male, aged 32, weight 70 kilos (157 lbs.).

September 29, 30 and October 1.—Glucose in 200, 300 and 400 gm. amounts retained. No glycosuria.

October 6.—0.1 gm. post. lobe injection without sugar feeding gave no glycosuria.

October 7.—0.2 gm. post. lobe injection without sugar feeding gave no glycosuria.

October 11. Operation.—Sellar decompression. No post-operative glycosuria. No further feedings.

In the following case sugar was well taken and it was possible to make comparative tests of the tolerance for ingested glucose and lævulose, it being shown that the assimilation limit for glucose was by weight of sugar about twice that for lævulose. The tolerance for glucose was 4.9 gms. per kilo of body weight; for lævulose it was 2.3 gms. per kilo. A gain of 5 lbs. in weight occurred during the sugar feeding. The case is important also in that it was the first of our series in which a definite therapeutic dosage for ingested extract was established on the basis of giving enough gland to produce a transient lævulosuria, with an amount of lævulose which would have represented the assimilation limit of a normal individual of an equal body weight. This was about 30 gms. below her estimated limit.

CASE XIII.—No. 27619. *April 12, 1911.* (Hypophyseal "adenoma.") Female, aged 30, weight 71 kilos (158 lbs.).

April 13.—Lævulose 150 gms. gave a suggestive reduction.

April 14 and 15.—Glucose in 200 and 250 gm. doses was negative.

April 16.—Glucose 300 gms. gave a suspicious reduction.

April 18.—Glucose 350 gms. positive. *Estimated limit* 325.

April 19.—Lævulose 160 gms. positive. *Estimated limit* 150.

April 20. Operation.—Removal of a large portion of the tumor (or hyperplastic gland) by the usual infralabial approach. Good recovery.

May 3.—Treatment with whole gland feeding instituted in 0.2 gm. doses three times a day. Marked subjective improvement. No spontaneous glycosuria.

To determine a more accurate basis for the glandular therapy the following tests were made with increasing amounts of glandular extract ingested while the sugar amounts remained stationary.

May 10.—Lævulose 120 gms. with 0.6 gm. of whole gland extract divided in three doses during the day. No reducing substance in urine.

May 11.—Lævulose 120 gms. with 1.2 gm. divided in three doses during the day. Positive reduction in specimen on evening of this day. Positive Seliwanoff test for lævulose. Estimated therapeutic dosage, therefore, 0.4 gm. of the whole gland extract three times a day.

Judging from the estimates given by the preceding record on the lævulose basis alone, the three following cases show an enormous increase in the assimilation limit for sugars—in *Case XIV* 200 gms., or 2.8 gms. per kilo; in *Case XV* 300 gms., or 4.3 gms. per kilo, and in *Case XVI* also 4.3 gms. per kilo. If we are to multiply these figures for weight of ingested lævulose by two, the amount of glucose necessary to reach the limit of tolerance would in many cases easily exceed the individual's capacity of its retention.

---

[10] These matters have been fully discussed by one of us in a de- led description, as yet unpublished, of the clinical aspects of ese states (Cushing: Clinical aspects of dyspituitarism. Lec- re before the Harvey Society, New York, December, 1910).

It has been found by Cushing and Jacobson that the cerebro- inal fluid, particularly in cases of obstructive hydrocephalus, s the same power in reducing the assimilation limit of the dog d rabbit that is possessed by the extract of the posterior lobe elf, another indication, in addition to these recorded by Cush- and Goetsch, that the cerebrospinal fluid is the medium which rries the products of posterior lobe secretion.

Case XIV.—No. 27419. ***March 13, 1911.*** **(Hypophyseal "adenoma.") Female, aged 34, weight 72 kilos (160 lbs.).**

March 14.—**Lævulose 150 gms., atypical reduction.**

March 15.—**Lævulose 200 gms., a slight but definite reduction.** ***Estimated limit.***

Case XV.—No. 27156. ***January 1, 1911.*** **(Infundibular tumor.) Female, aged 40, weight 69 kilos (154 lbs.).**

January 3 and 4.—**Lævulose 100 gms. and 200 gms., both negative.**

January 5.—**Lævulose 300 gms. gave a slight reduction on the third specimen.** ***Established limit.***

Case XVI.—No. 26250. ***July 16, 1910.*** **(Hypophyseal tumor.) Male, aged 27, weight 69.7 kilos (155 lbs.).**

July 18, 19, 20, 22.—**Glucose in increasing doses of 150, 200, 250 and 300 gms. caused no glycosuria. An increase in weight of 1.6 kilos (3.5 lbs.) occurred during these feedings.**

July 24.—**Glucose 350 gms. vomited.**

July 26.—**Glucose 200 gms. with 0.1 gm. post. lobe ext. gave glycosuria with 0.4 per cent dext. rotation.**

August 3. ***Operation.***—**Sellar decompression.**

August 23.—**Glucose 200 gms. negative.**

August 25.—**Glucose 300 gms. positive, a post-operative lowering of the limit, presumably from liberation of post. lobe from pressure.** ***Tolerance*** **for ingested glucose estimated at 4.3 gms. per kilo.**

April 20, 1911.—**Returned for observation, with an advance in adiposity, etc.**

April 24, 26, 28.—**Lævulose in 150, 160 and 200 gm. doses gave no reduction.**

April 29.—**Lævulose 250 gms. gave a slight reduction in the first specimen.**

May 5.—**Lævulose 250 gms. gave an atypical reduction.**

May 6.—**Lævulose 300 gms. gave a** ***positive lævulosuria*** **by Seliwanoff's test. (Compare Case XXI.)**

There remain in this series of patients subjected to the sugar tests several in whom the symptoms of glandular insufficiency were equally outspoken, though the neighborhood pressure disturbances were relatively insignificant. Alterations in the sella turcica, however, were present in many of them. Thus in Cases XVI and XVII, the latter a typical instance of Fröhlich's syndrome, the glandular fossa was exceedingly small. That a condition of glandular insufficiency need not depend upon the presence of a tumor needs no comment. Indeed in all probability a primary glandular hypoplasia is just as common a starting point for hypopituitarism as it is for hypothyroidism and the clinical states arising from disturbances of one or the other of these glands are in all probability equally frequent.

In the following case, as in Case XIII, sugar was well borne so that comparative estimates for lævulose and glucose could be roughly established at 4.7 gms. of glucose per kilo. and 2.9 gms. of lævulose per kilo.

Case XVI.—No. 27140. ***December 29, 1910.*** **(Sexual infantilism with painful adiposity.) Female, aged 23, weight 59 kilos (132 lbs.)**

December 30.—**Glucose 200 gms. negative.**

January 1, 1911.—**Glucose 300 gms., slight reduction.** ***Estimated limit*** **280.**

July 12.—**Lævulose 150 gms. negative.**

July 13.—**Lævulose 200 gms. positive.** ***Estimated limit*** **175.**

The next case was a typical example of infantilism of the *typus Fröhlich*. The assimilation limit for lævulose was 150 gms., or 2.8 gms. per kilo.

Case XVII.—No. 27421. ***November 13, 1910.*** **("Dystrophia adiposo genitalis.") Male, aged 9, weight 54 kilos (120 lbs.).**

November 12.—**Lævulose 100 gms., negative.**

November 15.—**Lævulose 150 gms., positive on first specimen.** ***Established limit.***

The two succeeding cases are similar ones, with adiposity and amenorrhœa. The first patient showed definite neighborhood symptoms and was epileptic. Her tolerance for glucose was about 200 gms., 3.3 gms. per kilo. The second patient assimilated glucose up to 275 gms., 2.7 gms. per kilo.

Case XVIII.—No. 25715. ***April 4, 1910.*** **(Hypophyseal adiposity with infantilism.) Female, aged 14, weight 61 kilos (136 lbs.).**

April 6, 11, and May 6.—**Glucose in 50, 100 and 150 gm. amounts was negative.**

May 9.—**Glucose 200 gms. positive, 0.4 per cent dext. rotation.** ***Established limit.***

May 14.—**Glucose 100 gms. with 0.1 gm. post. lobe ext., negative.**

May 17.—**Glucose 150 gms. with 0.1 gm. post. lobe ext., negative.**

May 23.—**Glucose 175 gms. negative.**

May 28.—**Glucose 175 gms. with 0.1 gm. post. lobe ext. positive, 0.6 per cent dext. rotation.**

Case XIX.—No. 25694. ***March 31, 1910.*** **(Hypophyseal adiposity.) Female, aged 15, weight 103 kilos (230 lbs.).**

April 8, 15, 20, 29.—**Glucose in amounts of 50, 100, 150 and 200 gms. was negative.**

June 4, 5.—**Glucose 225 gms. and 250 gms. respectively, negative.**

June 6.—**Glucose 275 gms. not retained.**

June 7.—**Glucose 275 gms. retained and gave glycosuria, 0.6 per cent. dext. rotation.** ***Established limit.***

June 10.—**Glucose 200 gms. with 0.1 gm. post. lobe ext., negative.**

Both of the following patients would have been regarded as typical instances of "adiposis dolorosa" with amenorrhœa, and their association with a pituitary lesion might have been overlooked had it not been for the fact that both showed definite symptoms—an early hemianopsia in one case and an enlarged sella, with pituitary headaches, in the other. Both showed a high tolerance, which, however, is less striking in relation to the body weight, owing to the extreme adiposity. In the first case the tolerance for glucose at 400 gms. represented a little over 3 gms. per kilo.

Case XX.—Surgical No. 26679. ***October 4, 1910.*** **("Adiposis dolorosa" with neighborhood symptoms.) Female, aged 55, weight 123 kilos (273 lbs.).**

October 25. ***Operation.***—**Sellar decompression.**

November 1.—**Hypophyseal therapy (9 grains daily of the whole gland extract) caused polyuria.**

November 12.—**Glucose 300 gms. negative.**

November 14.—**Glucose 400 gms., faint reduction.** ***Limit.***

about 275 gms., or 3.4 gms. per kilo. On readmission six months later there had been an increase in weight and a marked advance in the assimilation limit for glucose beyond the patient's capability to retain it. Her assimilation limit for lævulose had come to exceed the former limit for glucose by weight of sugar, namely, about 320 gms., or 3.6 gms. per kilo of existing body weight. (Compare Case XVI.)

CASE XXI.—No. 26225. *July 10, 1910.* (Hypophyseal adiposity.) Female, aged 24. Weight 81 kilos (181 lbs.).

July 10.—Glucose 150 gms. negative.

July 11.—Glucose 250 gms. atypical reduction.

July 13.—Glucose 300 gms. not retained.

July 14.—Glucose 300 gms. retained. Urine showed heavy reduction (not polarized). *Estimated limit* 275.

January 11, 1911. Readmission.—Gain in weight of 6.7 kilo. Glucose not retained in early tests.

January 22 and 23.—Lævulose 10 and 200 gms. negative.

January 24.—Lævulose 300 gms. gave an atypical reduction after 9 hours. *Estimated limit* 320.

January 28.—Lævulose 200 gms. with 0.4 gm. post. lobe ext. gave a positive reduction with Fehling's.

Summary of Clinical Data.—These bare records of the carbohydrate tolerance as it has been observed in the clinical cases of dyspituitarism suffice to show a striking parallelism with the protocols which we have given of the experimentally induced states of hypophyseal insufficiency. Their similarity is at all events enough to justify the assumption that here too we are dealing with a condition of altered activity of the posterior lobe.

Under both circumstances, apparently regardless of the influence of the pars anterior, the acquirement of a high carbohydrate assimilation limit goes hand in hand with other features which we are inclined to attribute to posterior lobe insufficiency and which appear to indicate a lowering of metabolic activity—notably a subnormal temperature, a dry skin, a low blood pressure, a large appetite (especially for carbohydrates), and marked deposition of fat throughout the body.

In these conditions then of primary or secondary involvement of the hypophysis, interfering with the normal production of glandular secretion and producing, among other things, a marked rise of the carbohydrate tolerance, glandular therapy should be instituted, perhaps taking the tolerance as an index for the amount of glandular extract to be given.

We are merely on the threshold of these carbohydrate studies n clinical cases, and fully recognize that the observations have been crudely made. They will necessitate quantitative determinations and better methods both of sugar administration and of giving the extracts. The latter problem is particularly mportant, if we are to advance the therapy of these condiions at least to the point where thyroid therapy now stands.[11]

GLANDS IN GENERAL AND TO THE HYPOPHYSIS IN PARTICULAR.

Glycosuria in its relation to lesions of the central nervous system received abundant attention after the first impulse given to the subject by Claude Bernard's discovery. The exact location, however, of his so-called sugar center seems never to have been precisely determined, and we have experimental evidence that glycosuria may likewise be produced by a *piqure* or other injury of the brain stem anterior to the medulla.

On the clinical side it was noted by several of the earlier writers that glycosuria was not infrequent in cases of basal brain tumor. Curiously enough, however, this proved to be more true of growths situated in the interpeduncular neighborhood than of those involving the hind-brain. Indeed Loeb[12] pointed out that it was actually a more frequent manifestation of tumors in the region of the hypophysis than of those supposedly in the neighborhood of Bernard's "center"; and more recently Stern and Josefson, to quote from Messedaglia,[13] have shown that clinical mellituria has been the exception (3 cases only) in the 36 reported cases of cysticercus of the fourth ventricle.

In explanation of the occurrence of diabetes with certain hypophyseal tumors Rath[14] in 1888 offered the suggestion that alterations might have taken place in the composition of the cerebrospinal fluid which caused it to act as an irritant upon the nervous structures—an interesting assumption, in view of our recent demonstration that the posterior lobe actually discharges its secretion into the cerebrospinal fluid. Others as Pineles[15] and Strümpel[16] explained the condition as possible only on the basis of a concomitant pancreatic lesion, and still others hypothecated the existence of centers, other than that of Bernard's, which presided over the glycogenic function. Such centers were postulated for the pons, for the optic thalamus, the cerebellar and cerebral peduncles, and finally Loeb offered the interesting suggestion, which was supported by Caselli and accepted by a number of subsequent writers, that the *tuber cinereum* (the cortical tissue around and including the infundibulum) might be a sugar center.

---

[11] In this connection the observation in Case XIII is particularly worthy of note, as giving some lead as to the dosage essential to he individual case on the basis of the carbohydrate tolerance. he patient weighed 71 kilos and showed an overtolerance for ævulose, the limit being estimated at 150 gms. Judging that her ormal tolerance for lævulose would have been about 120 gms. she was given sugar in this amount on consecutive days. Meanwhile the amount of extract was increased until a positive transient mellituria followed the sugar administration. This established the amount of extract at 0.4 gm. (6 grains) three times a day as the therapeutic dose. It is to be noted that we are here speaking of "whole gland" feeding with the realization that it is the posterior lobe extract which the preparation contains that is the essential element. Though we have worked with isolated posterior lobe preparations in the experiments in the laboratory, they are as yet too expensive for prolonged administration such as these individuals need.

[12] M. Loeb. Hypophysis Cerebri and Diabetes Mellitus. *Centralbl. f. innere Med.*, 1898, XIX, p. 893.

[13] Messedaglia. Lesioni dell' ipofisi e glicosuria. (Reprint.) Reviste Sintetiche, Milan, No. 30, 1903.

[14] Rath: Ein Beitrag zur Kasuistik der Hypophysistumoren. Inaug. Diss. Göttingen, 1888.

[15] Pineles. Ueber die Beziehung der Akromegalie zum Diabetes Mellitus. *Jahrb. d. Weiner k. k. Krankenanst.*, 1895, IV, Part II, p. 27.

[16] Strümpel. Ein Beitrag zur Pathologie und pathologischen Anatomie der Akromegalie. *Deutsche Ztschr. f. Nervenheilk.*, 1897, XI, p. 51. In his interesting detailed report of a case Strümpel makes the following deduction: "Den Hypophysistumor als Ursache der Glycosurie anzunehmen, ist unmöglich, da Hypophsistumoren auch ohne Glykosurie vorkommen." A similar deduction has misled others into the statement that because tumors of the hypophysis are found without acromegaly therefore this malady cannot be attributed to the tumors which have been found present in certain cases.

In more recent years a furtherance of our knowledge of these glycosurias of supposedly encephalic origin has come about indirectly through the many investigations upon the rôle played in carbohydrate assimilation by the functional activity of the various glands of internal secretion.[17]

The relationship of the pancreatic islets to the more common and more persistent forms of clinical diabetes was clearly shown by the important studies of Opie and others, but only of late has the attention which they deserve been given to other ductless glands in so far as their activities influence carbohydrate metabolism. It has become evident that all of the glands, either by their primary action or through interrelation with other members of the series, play a part in sugar metabolism. It is known, for example, that experimentally induced thyroid insufficiency leads to an increased tolerance for sugars,[18] while the studies of Eppinger, Falta and Rudinger[19] have indicated that removal of the parathyroid bodies has a contrary effect, namely, a lowering of the carbohydrate assimilation limit. Furthermore, experimental hyperglycæmia and glycosuria have been produced by injections of epinephrin, which apparently exercises its influence through the splanchnic control of the glycogenic function of the liver.[20]

Clinical corroboration of these laboratory findings have been many. Thus the carbohydrate tolerance in hypothyroidism (myxœdema) has been found in many clinical cases to be high and, contrariwise, in hyperthyroidism—a condition which as yet has not been experimentally reproduced—it is known that the assimilation limit is below the normal. Indeed, in extreme grades of exophthalmic goitre spontaneous glycosuria may occur, and it has been observed that the administration of thyroid extract in adequate dosage may precipitate an actual glycosuria in the patients with exophthalmic goitre in whom it does not spontaneously occur.[21]

However, one need not turn to actual morbid states to find striking illustrations of perverted tolerance for carbohydrates. A particularly good example occurs in pregnancy, with its remarkable alterations in metabolic activity—alterations which are unquestionably an expression of change in the activity of all of the glands of internal secretion and not of the ovary and its contained corpus luteum alone. The accompanying thyroid hyperplasia is well known, but an even more striking change, taking place in the hypophysis cerebri, has been brought to light by Erdheim and Stümme's important study.[22] We have been able to substantiate their disclosure that the hypophysis is not only much enlarged during pregnancy but that the *pars anterior* shows a characteristic and unmistakable histological picture.

Clinical observers have long known that as a result of repeated pregnancies evidences of hypophyseal hyperplasia may occur, even to the point of producing such neighborhood symptoms as a transient bitemporal hemianopsia. Furthermore, in this state the carbohydrate metabolism becomes altered in ways which are similar in many respects to the changes which we have recounted. Thus in a series of pregnant women observed by Reichenstein,[23] it appeared that out of 93 cases 11.8 per cent showed actual mellituria, while in others a decreased carbohydrate assimilation limit, especially for lævulose, was demonstrated. Indeed, a transient spontaneous lævulosuria occurred in some of the cases after parturition.

Doubtless comparable alterations in sugar tolerance occur in other periods of physiological readjustment. It is not unlikely that the glycosurias of adolescence may prove to be coupled in some way with deviations in the internal secretions which are on the borderline of the physiological normal. In view of the occurrence at this period of life of a rapid increment particularly in skeletal growth, it is a natural conjecture that these glycosurias may be related as closely to an hypophyseal hyperplasia as to the more obvious changes of the interstitial cells of testis and ovary which occur at this time. But the facts already established make a sufficiently connected story to justify the avoidance of speculation.

We have already referred to the frequent coincidence of mellituria with acromegaly. Hanseman in 1897 collected reports of 97 cases, 17 of them having shown glycosuria, and he expressed the opinion that the percentage of positive findings would have been much larger had the cases been sufficiently observed. Strümpel, in the same year, suggested that future investigations of the sugar tolerance in this malady would demonstrate for all cases a lowered assimilation limit even though spontaneous glycosuria might be absent. It apparently was his view that some underlying factor affecting metabolism brought about both of these conditions rather than that one of them was dependent in any way upon the oted in 14 out of 130 reported cases of acromegaly, and subequently Launois and Roy[24] recorded 16 cases with "diabees" the post-mortem finding in three instances having shown pituitary enlargement.

---

[17] It is to be noted that, if our view as to the method of secretory discharge from the posterior lobe into the cerebrospinal fluid is supported by the investigations of others, this part of the gland will be removed from the ductless gland series in so far as they are grouped together on the basis of their products of secretion being taken up directly by the blood stream.

[18] McCurdy. The influence of thyroidectomy on alimentary glycosuria. *J. Exper. Med.*, 1909, XI, p. 798.

[19] Eppinger, Falta and Rudinger. Ueber die Wechselwirkung der Drüsen mit innerer Sekretion. *II Mitteil., Ztschr. f. klin. Med.*, LXVII, p. 380.

[20] Underhill and Clossen. *Am. J. Physiol.*, 1907, XVII, p. 42.

[21] Kraus and Ludwig: Klinische Beiträge zur alimentären Glycosuria. *Wiener klin. Wchnschr.*, 1891, IV, No. 46, p. 855 and No. 48, p. 897.

[22] Erdheim and Stümme: Ueber die Schwangerschaftsveränderung der Hypophyse. Beiträge z. path. Anat. u. z. all. Path., 1909, XLVI.

[23] Reichenstein. Glykosurie und Schwangerschaft. *Wiener klin. Wchnschr.*, 1909, XXII, p. 1445.

The evident suggestion from these clinical observations, hat the hypophyseal lesion played at least a certain rôle in liciting the glycosuria, naturally led to certain experimental ttempts to reproduce the condition. These attempts were ecessarily limited to destructive glandular lesions; and that he end results of the partial extirpations by Rogowitsch, 'aselli, and Friedman and Mass were negative in this respect s now readily explained by the analysis of the protocols hich we have given. The experiments, in other words, were roductive of an ultimate increase (unfortunately unobserved) ather than the expected persistent lowering of the sugar ssimilation limit.

The recent clinical and experimental studies of Borchardt[25] ave been far more suggestive than any heretofore made. In n investigation of 176 recorded cases of acromegaly he found hat spontaneous glycosuria had occurred in 63 and that in ight others there was a lowered assimilation limit—all told, herefore, 71 showed a deficient carbohydrate metabolism. On he other hand, none of the cases of hypophyseal tumor unasociated with acromegaly which had been reported since 1886 howed glycosuria. The query was naturally raised as to why uch a discrepancy should exist if the stimulation of a supposed sugar center in the *tuber cinereum* were actually the ause of the glycogenolysis in the former cases.

Borchardt was able to find in the literature only 10 cases f acromegaly without spontaneous glycosuria, in which the olerance for ingested sugars ("alimentary glycosuria") had een tested. Of these, all but two were positive, that is, they owed an assimilation limit below the normal. He coments, however, on the fact that there may be considerable riation from time to time in the individual's tolerance, and ves one specific instance of an acromegalic who had shown ontaneous glycosuria five years previously and yet at the me of his observation gave a negative reaction to 150 gms. glucose. Had Borchardt looked upon this as the rule ther than the exception for the later stages of the disease, would doubtless have anticipated the main outcome of our n studies.

Acting on the assumption, therefore, that there was a pertently lowered carbohydrate tolerance in the disease and at it was occasioned by an overactivity of the gland, he enavored to simulate this condition, not by glandular extirtion, but by the hypodermic administration of an extract rived from the whole gland. He was able to show, especially rabbits, that this extract caused hyperglycæmia and glyuria, the reducing body being glucose. With dogs his results were much less convincing, the only satisfactory result being obtained in a partially pancreatectomized animal soon after the operation. Later, however, in this same animal no glycosuria could be obtained. (Compare our Protocol No. 35.) Though appreciating the insufficiency of his experimental proofs, Borchardt interpreted his results as at least suggestive of the fact that hypophyseal hyperactivity was responsible in the clinical cases for the glycosuria. He made no distinction, it will be noted, between the anterior and posterior lobe and the possible individual rôles played by these subdivisions of the gland.[26]

This brief sketch of some of the more important earlier studies suffices to show that glycosuria is known to be a frequent accompaniment of acromegaly associated with a hypophyseal tumor or hyperplasia, and on the other hand, as pointed out by Borchardt, that tumors of the hypophyseal neighborhood unassociated with acromegaly do not cause this symptom, which therefore can hardly be attributed to the stimulation of a neighboring sugar center. Furthermore, experimental removal of the gland has failed to cause a permanent lowering of the tolerance, indeed, Borchardt's observations in the reverse direction, simulating hyperfunction of the gland by the injection of the glandular extracts, have shown that under these circumstances there is at least a temporary tolerance lowering effect.

As the outcome of our laboratory and hospital studies we believe that not only these few established facts concerning the relation of the hypophysis to sugar tolerance but also some of the conjectural views, those of Rath and of Loeb for example, as well as many of the apparent discrepancies which have been the outgrowth of attempts to refute them, are easily correlated and readily explainable on a single basis. This is that conditions of overactivity or functional hyperplasia of the posterior lobe (*pars nervosa et intermedia*) foster glycogenolysis and occasion a lowered sugar tolerance if not an actual glycosuria, whereas in conditions of lowered

---

Launois and Roy. Glycosurie et Hypophyse. *Compt. rend. de biol.*, 1903, LV.

Borchardt. Die Hypophysenglykosurie und ihre Beziehung Diabetes bei der Akromegalie. *Ztschr. f. klin. Med.*, 1908, I, p. 332.

[26] Some doubt has been raised concerning Borchardt's results by the subsequent studies of Franchini (Die Function der Hypophysie und die Wirkungen der Injection ihres Extraktes bei Tieren. *Berlin. klin. Wchnschr.*, 1910, No. 14-16), who was unable, except with massive doses either subcutaneously or intravenously to produce glycosuria either in rabbits or dogs. Franchini is inclined to attribute the positive results obtained by Rossi (Il Tommasi, 1909, No. 25-26) in support of Borchart's findings to the fact that Rossi used carbolic acid as a preservative of his extracts, a substance which of itself may cause glycosuria. Our own results with the injection of posterior lobe extract and concentrated cerebrospinal fluids confirm Borchardt's findings in so far as they show that a spontaneous glycosuria in normal rabbits is easily elicited, and we have found that a definite lowering of the assimilation limit occurs in normal dogs.

These discrepancies are possibly attributable to the various methods of preparing the extracts. Our own extract is supplied from the dried and powdered posterior lobe. This, according to weight of powder, is dissolved in the desired number of centimeters of boiling water. This sterilizes the powder and does not affect the active principle, which is not only very soluble but very resistant to heat. The supernatant fluid is used for the injection. For the feeding tests the powder itself is used.

activity or hypoplasia the carbohydrate tolerance becomes distinctly higher than the normal.

Thus it is our belief that the *experimental observations* in the past have been for the most part regarded as negative through misinterpretations, three important factors having been overlooked: (1) that *it is the posterior lobe secretion which is chiefly concerned in these deviations from the normal in the tolerance for carbohydrates;* (2) that *a persistent lowering of the assimilation limit can be brought about only by an overactivation of this part of the gland* and the physiological state is one which as yet cannot be experimentally reproduced. Finally (3) that *glandular extirpations which include the posterior lobe lead to a terminal increase in sugar tolerance rather than to the long sought for lowering of the assimilation limit.* So far, therefore, as the simulation of conditions of disease is concerned, experimental investigations of the function of this or of any other of the ductless glands is narrowed largely to the negative method of study through extirpation, for we know of no way of stimulating any one of these structures into a condition of persistent overactivity, the injection of extracts by no means answering the purpose.

The past *clinical observations* on the relation of hypophyseal disease to sugar tolerance have been similarly misconstrued, as the following essential factors have been overlooked: (1) that *the posterior lobe secretion is here again primarily concerned;* (2) that *in acromegaly, whether or not there exists, as there often does, an obvious tumor or hyperplasia of the pars anterior, there is in the early stages a coincident primary posterior lobe hyperplasia which is responsible for the glycosuria, or lowered assimilation limit; and* (3) that *inasmuch as the posterior lobe secretes into the cerebrospinal fluid rather than directly into the blood stream, a condition, comparable to a posterior lobe hypoplasia, is produced not only by all interpeduncular tumors which actually compress the gland but also by all distant ones which obstruct the cerebrospinal fluid outflow; and finally a functional hypoplasia occurs as the end-result of the actual pituitary struma which characterizes acromegaly.* All of these stages are productive of posterior lobe insufficiency and lead to an over-tolerance for carbohydrates.

There is still much difference of opinion in regard to the ætiology of acromegaly, and even in the minds of those who are inclined to attribute the disease to an hypophyseal lesion —implying usually the pars anterior—there are doubts as to whether it is the outcome of a lessened or an increased glandular activity. It is our own view that at least the skeletal changes of the malady are an expression of an anterior lobe hyperplasia, which occasionally becomes transformed into an extensive tumor formation (the adenomas and sarcomas of many writers). However this may be, in the early stages of the disease there is seemingly an activation of the posterior lobe leading, among other symptoms, to the glycosuria or lowered tolerance which we have discussed; in the later stages, through actual destruction, or invasion, or compression of the posterior lobe and pars intermedia, a state of posterior lobe insufficiency supervenes, with an increase of carbohydrate tolerance.

This same effect upon posterior lobe secretion, and consequently upon sugar tolerance, is brought about in similar fashion by a primary hypoplasia of the posterior lobe or by a superimposed (interpeduncular) tumor, or, thirdly, by a remote lesion which has produced an internal hydrocephalus. Unfortunately in the past, studies of carbohydrate assimilation have been directed almost solely toward the investigation of states of lowered sugar tolerance, to the utter neglect of the more common states of greatly increased tolerance which not only seem to be inevitable in advanced cases of acromegaly but which constitute the main metabolic disturbance in the variously named cerebral, or what we should prefer to call hypophyseal, adiposities—dystrophia adiposo-genitalis, adiposis dolorosa, and many of the hydrocephalies—as well as in some of the diverse states of feminism and infantilism which are encountered.

We think that our experiments have afforded the first satisfactory interpretation of the conflicting results of preceding studies, showing, as they appear to do, in the first place, that a discharge of posterior lobe secretion caused by manipulation of the infundibular stalk is responsible for the spontaneous temporary glycosuria, which appears, as noted by Caselli and others, soon after the operation; in the second place, that a deficiency of posterior lobe secretion, as simulated by partial or total removal of this lobe in dogs, occasions an increased tolerance to carbohydrates; and thirdly, that administration of posterior lobe extract by mouth, hypodermically or intravenously has the power of diminishing this acquired overtolerance.

The precise manner of action of the posterior lobe secretion in producing hyperglycæmia and glycosuria—whether by a direct glycogenolytic effect, or by some influence exerted on the sympathetic antonomic nervous system as seems to be the case with adrenalin, or in other ways—must remain unanswered for the present. It has been conjectured that the extract might have an action similar to phlorizin and cause a renal lesion, allowing the normal sugar content of the blood to pass through the kidneys; but this seems unlikely in view of the fact that we have been able to show for the dog what Borchardt demonstrated for rabbits, namely, that the administration of hypophyseal extract produces a hyperglycæmia. Others have advanced the idea that some effect of the extract on the pancreas would prove to be the underlying factor in the glycosuria; and this it will be recalled was the view of Pineles and Strümpel. We have confirmed the statement of Sweet and Pemberton that posterior lobe extract acts in a fashion similar to adrenalin in inhibiting the external flow of pancreatic juice, and it is conceivable that it may likewise exert an influence on the internal secretion of the islets, but this hardly seems to be the direction which the final explanation of these phenomena will take.

On the clinical side, we believe that the data which we have given will have a considerable therapeutic significance, for on the basis of existent carbohydrate tolerance it should be possible to determine whether a particular case of obvious hypophyseal disease is associated with an over or under activity of the posterior lobe, and thus whether it is advisable or not to ad-

in the early stages of acromegaly the sugar tol-
rance is apt to be low but that later in the disease there is an
cquired overtolerance; furthermore, that a high assimilation
mit may be expected from the outset when the gland is com-
ressed or obstructed by a superimposed tumor which brings
bout alterations comparable to those of a primary posterior
obe hypoplasia. Hence it may be assumed that in the early
ages of acromegaly glandular therapy is contraindicated,
hereas later in the disease its use would seem to be highly
dvisable. The circumstances are similar to those relating to
ie administration of thyroid extract, which is contraindi-
ated in Basedow's disease but gives such brilliant re-
ilts in myxœdema. It is clear, furthermore, that hypophy-
al extract is indicated in all of the cases of hypopituitarism
hich are brought about by obstructive agencies (tumors or
ydrocephalus). Our best clinical results of glandular therapy
ave been seen in cases of this type, and the dosage, we believe,
iould be estimated for each case on the basis of the indi-
idual's grade of tolerance for carbohydrates.

VI. SUMMARY.

I. *Experimental Studies.*—We have shown that the secre-
ory product of the posterior lobe (*pars nervosa et intermedia*)
discharged into the cavity of the third ventricle and be-
omes dissolved in the cerebrospinal fluid, a medium which
asses from the ventricles to the subarachnoid spaces and
ience, in all probability, enters the blood stream by way of
ie dural sinuses.

Under various forms of operative manipulation of the in-
ndibulum and hypophyseal stalk—structures which appear
hold the reserve deposit of posterior lobe secretion—a tran-
ent hyperglycæmia is produced, presumably due to the set-
ng free of an excess of this secretion, which in turn causes
e discharge of stored glycogen. For the succeeding few
ys the assimilation limit for ingested carbohydrates is con-
lerably diminished, "alimentary glycosuria" being pro-
ced by a smaller amount of sugar than was previously re-
ired.

If the operation has been so conducted as to create a subse-
ent and permanent insufficiency of posterior lobe secretion
ther owing to the removal of a considerable portion of this
e with its epithelial investment, or through interference
h its secretory discharge either by the placement of a "clip"
the stalk, or by so damaging it that an infundibular cica-
forms) the temporary lowering of the assimilation limit
ucceeded by an abnormal and enduring augmentation in
tolerance for sugars.

he assimilation limit for carbohydrates, greatly increased
er these circumstances, can be promptly lowered by the
cident intravenous or subcutaneous injection of posterior
extract. This extract, furthermore, has a pronounced
t in lowering the sugar tolerance of the normal animal in
n it may even cause glycosuria when given in sufficient
ge.

creased tolerance for carbohydrates. One of these is a tendency toward the acquirement of a generalized adiposity, which suggests the conversion of the stored sugars into fat. Thus, during the tests to establish the carbohydrate tolerance, whether in experimental or clinical cases of posterior lobe deficiency, there often occurs a notable accretion in body weight. The individuals are apt to have a subnormal body temperature, suggesting an imperfect oxidizing or metabolizing capacity, and this persistently lowered temperature can be raised by the injection of glandular extracts. Conversely, repeated hypodermic injections of posterior lobe extract in the normal animal are apt to cause a profound degree of emaciation, presumably from excessive tissue katabolism; and a lowered carbohydrate tolerance is demonstrable during such an administration of the extract.

For these reasons we believe, contrary to the opinion advanced in a previous paper by Crowe, Cushing and Homans, that the tendency toward adiposity displayed by partially hypophysectomized animals is not due solely to a deficiency of anterior lobe secretion.

II. *Clinical Studies.*—In view of the fact that the products of posterior lobe secretion enter the cerebrospinal fluid, it is apparent that any intracranial lesion occasioning stasis of this fluid will lead to symptoms of posterior lobe insufficiency. An internal hydrocephalus therefore, of whatever origin, is doubtless the most common source of moderate grades of this condition. Tumors which arise in the interpeduncular space and directly compress and deform the infundibular attachment and thus "block" the secretion furnish another not infrequent source of the same symptoms. A third form of posterior lobe deficiency occurs as a late manifestation of a pre-existing hypophyseal hyperplasia—much as, in the case of the thyroid gland, evidences of myxœdema in the course of time, are likely to supervene on states of hyperthyroidism.

It is well known that hyperglycæmia is of frequent occurrence in acromegaly and gigantism—clinical states which presumably represent, at the outset at least, a condition of hyperpituitarism, the pars anterior doubtless being chiefly responsible for the skeletal changes. We believe, however, that there is an inevitable tendency in these states toward an ultimate glandular insufficiency—toward dyspituitarism, in other words. Hence, in all probability a lowered sugar tolerance will be found only during the active stages of these maladies. Thus in all but two of the ten cases of acromegaly that we have studied, the individuals have begun to show present evidences of posterior lobe hypoplasia which are recognizable through the laboratory experiences with animals suffering from comparable states which have been experimentally produced. They are acquiring adiposity, have subnormal temperatures, and often show an extraordinarily high carbohydrate assimilation limit. In view of this marked transition from a low to a high sugar tolerance which occurs during the progress of the malady, the discordant results of the past studies of metabolism in acromegaly are not surprising.

As polyuria is apt to be associated with these pituitary lesions, whether experimentally produced or the outcome of disease, a clinical picture readily mistaken for diabetes mellitus or diabetes insipidus may be present. It is not improbable, furthermore, that the fleeting glycosurias following fractures of the base of the skull are induced by trauma of the posterior lobe or its infundibular attachment—glycosurias, in other words, which are comparable to those which can be elicited by operative manipulation of these structures.

In view of the ease with which a transient hyperglycæmia may be produced by these hypophyseal lesions, it is possible that our views in regard to the glycosurias, at least those of supposed encephalic origin, need some revision.

If loss or diminution of the internal secretion of the pancreas robs the tissues of their power of metabolizing carbohydrates, certainly loss or diminution of the secretion of the hypophyseal posterior lobe greatly enhances their power in this respect. In view of the generalized adiposity, not confined to the panniculus alone, but observable also in liver and muscle as well as in the other organs in these states, it would seem that functional deficiency of the posterior lobe permits the excess of stored carbohydrates to be transformed into fat.

In these states of beginning adiposity indicating a pituitary hypoplasia, glandular administration is indicated, and it is possible that the therapeutic dosage for the individual case may be determinable on the basis of the quantity of extract necessary to produce mellituria with an amount of ingested sugar which would be expected to represent the individual's normal assimilation limit.

DISTORTIONS OF THE VISUAL FIELDS IN CASES OF BRAIN TUMOR.[1]

STATISTICAL STUDIES. (FIRST PAPER.)

By Harvey Cushing, M. D., and George J. Heuer, M. D.,
The Johns Hopkins Hospital, Baltimore, Md.

INTRODUCTORY.

Of the manifold symptoms which may be produced by an intracranial growth none are of greater interest and none of greater importance than the various disturbances on the part of the visual apparatus. On the one hand, largely irrespective of the seat of the lesion the direct ophthalmoscopic examination of the eye-grounds may reveal the characteristic neuro-retinal stasis and œdema (choked disc), which unfortunately is still regarded by many as essential to the diagnosis of tumor, despite the fact that it is a comparatively late pressure phenomenon. On the other hand, deviations from the normal outlines of the visual fields not only may serve as the only possible means of determining the siuation of the growth, but may at times even foretell the onset of a choked disc, for certain distortions of the color field boundaries appear to be brought about by general pressure disturbances.

Hence the ophthalmoscope, though chiefly useful in disclosing the most reliable of the objective signs of increased intracranial tension, nevertheless is of some value for localization, as it may show upon which side the tension is greater. The perimeter, contrariwise, is chiefly useful as an aid to localization, though it furnishes at the same time important information in regard to the existence of an increase of tension. These two instruments, therefore, are the most useful and should be the most used of all the paraphernalia accessory to the making of a neurological investigation; and, needless to say, every physician and every surgeon who desires to make an intelligent study particularly of intracranial tumors must familiarize himself with these important diagnostic aids, without which he would be as helpless as the clinician unfamiliar with the stethoscope in the presence of a cardiac lesion.

As the outcome of some investigations relating to the subject of choked disc, started by one of us in 1905 in conjunction with Dr. James Bordley, it has become our clinical routine not only to make frequent, often daily, observations on the condition of the eye-grounds, but also to make serial tests of visual acuity and repeated perimetric charts of form and color before and after our operative procedures. Dr. Bordley drew attention early in the course of these studies to the frequent association of color interlacing with low grades of increased intracranial tension. In a communication dealing primarily with this subject[2] comment was also made upon certain matters which bear relation to the subject of hemianopsia. The more important of them in the present connection, was the fact that in cases of homonymous hemianopsia the color inversion or interlacing is demonstrable for the seeing half of the retina just as it is for the entire field when there is no regional implication of the visual pathway.

Since presenting this earlier paper in May, 1909, correspondingly detailed studies have been made of 104 additional cases of tumor, and we desire in the present communication to record the results of perimetry in the entire series of 200 surgically treated cases which have been observed during the past five years.[3]

One must be familiar from personal experience with the so truly realize the amount of patience and time often required if a reliable record is to be secured. The individual performance is fatiguing enough, alike to observed and observer, but when alterations are taking place from day to day, so that serial performances are called for, one could hardly subject himself and his patient to the ordeal were not the results often of vital importance, either in presaging the necessity of prompt relief from pressure or in estimating the quality of relief which the operation has afforded. Naturally, in many of our surgically fatal cases but a single perimetric examination has been made before the operation, but in far the larger number a series of charts has been plotted—as many as ten or twenty in some instances where patients have been kept ong under observation after simple palliative measures. While awaiting the time for a "silent" lesion to finally give evidence of its location, the condition of the visual fields—the color relationship in particular—taken in conjunction with he degree of œdema of the nerve-head, is the most accurate means of estimating the need of further intervention.

---

[1] This communication is the first of a series of five papers, the four to follow dealing respectively with dyschromatopsia and with the binasal, bitemporal and homonymous hemianopsias which have been observed in a series of 200 cases of brain tumor.

[2] Bordley and Cushing: Alterations in the color fields in cases of brain tumor. *Arch. Ophth.*, 1909, XXXVIII, p. 451.

[3] The fields in these cases have been plotted by Drs. Bordley, Heuer, Crowe, Goetsch and Sharpe, and when there has been any question of inaccuracy on the part of patient or observer, or any unusual peculiarity of the fields, they have been replotted by a second observer who has not seen the original charts, in order to eliminate the possible errors of personal equation.

The color inversion and choked disc of the average tumor in ts early stage disappear as a rule after the usual subtemporal decompression. One must, however, in these cases have the expectation that the relief will be only temporary and that further intervention will be necessitated after a number of months, even though no localizing signs have as yet appeared. Hence, an examination of these patients every few weeks or months is advisable in order that a return of the pressure ymptoms may be promptly recognized. Thus it is that in many of our cases the fields have been plotted a great number f times; and in the series of authenticated tumor cases there re, all told, some four hundred perimetric charts appended o the histories, and if the charts of the patients under the uspicion of carrying a tumor were added to these the number ould doubtless be doubled.

How helpless one may actually be in attempting to make a egional diagnosis without the aid of perimetry is realized most effectually in the case of young children or of blind atients whose fields have not been previously taken. When a hoked disc has advanced to the stage of complete atrophy he occipital lobes and optic radiations become "silent," so r as any objective signs useful for a regional diagnosis are ncerned, and in several of our patients the localization of sions which proved post mortem to have been accessible and movable has been completely frustrated in this way.

A number of the patients who were blind upon admission ve brought fields which had been plotted elsewhere before e total loss of vision occurred. Though these records have casionally been useful, they have, as a rule, been so casually ken—in one case, indeed, the blind areas were actually re- rsed on the cards—that most of them (even those plotted by lled ophthalmologists, have been too unreliable for diag- stic purposes. Too few circumferential points are usually en and the cards, as a rule, are so small that the color in- lacing, on which we have come to lay so much stress, is not arent. Furthermore, a number of our best illustrations

of hemiachromatopsia were entirely overlooked on tests made shortly before the patients' admission to the hospital, the fields for form alone having been recorded.

How accurate one needs to be in plotting the charts is well illustrated by a recent experience in which an erroneous observation of our own was fortunately corrected for us by Dr. Adolph Meyer, whose description of the course taken by the geniculo-calcarine fibers is of primary importance.[4] The story is as follows:

Surgical No. *26762*.—The patient had been shot in the left eye five years before admission. The missile had destroyed the eyeball, necessitating enucleation, and had produced an immediate, total and permanent left facial paralysis with complete deafness in the left ear. He recovered from the effects of the injury, but after some months began having peculiar seizures with inaugural subjective disturbances of taste and smell. These attacks gradually became more severe and in the course of time led to typical convulsive fits with a gustatory aura, smacking of the lips and a final loss of consciousness—typical uncinate gyrus fits.

On examination there was a total peripheral palsy of the left seventh and eighth nerves, and with the X-ray a bullet was shown lodged in the petrous portion of the left temporal bone. There was a scar nicking the lower left eyelid, and it was apparant that the missile in its course must have transversed the lower part of the temporal lobe.

In view of Dr. Meyer's description of the temporal loop of the optic radiation it seemed probable that the perimeter would show a partial right hemianopsia, or at least some defect in the field of the remaining (right) eye. The fields were consequently taken (Fig. 1), and were interpreted as being normal. Fortunately Dr. Meyer saw the patient at this time and suggested that the fields be replotted, with a closer angulation, namely, for every fifteen degrees at least. When this was done the defective sector which he had foretold was disclosed in the upper outer quadrant (Fig. 2), corresponding with the damaged fibers of the lower part of the pathway in the injured temporal lobe. The defect, of course, would have been a bilaterally homonymous one had the left eye not been destroyed.

This experience serves as a good illustration of the care essential to the making of these records. A further need for precaution which is not fully appreciated lies in the possibility of misjudging the existence of a tendency to vertical hemianopsia. For in these cases it is necessary, in order to accurately determine the superior and inferior points on the vertical meridian, that the disc be advanced toward the fixation point only a few degrees from the median line, first on one side and then on the other. If the median line alone is relied upon and the disc happens to be advanced toward the center merely a degree or two from the exact mid-line and on the side of the blind field, the highest (or lowest, as the case may be) median point will be missed and the field boundary will appear to slant across instead of dropping away rather abruptly from the poles of the vertical meridian. Unless regard is paid to this, an existing tendency toward hemianopsia may be entirely overlooked. This applies to the color fields as well as to that for form, and in estimating the field for form (or for white) in suspicious cases gray discs are often useful, for the form outline may seem intact with the usual white disc and yet vision in one or the other half fields be definitely obscured.

---

[4] Adolph Meyer: The connections of the occipital lobes and the present status of the cerebral visual affections. *Trans. Ass. Am. Physicians*, 1907.

There are other precautions which are more familiar and to which attention is more often called—the avoidance of distortions from fatigue and inattention, the distinction of the white from the form fields, the employment of pure and uniform colors, and the like.[5]

Statistical Review.

All told, in the period of twenty-one years, from January 1, 1890, to January 1, 1911, 242 patients with cerebral neoplasm have been operated upon in Professor Halsted's clinic at the Johns Hopkins Hospital. In the first fifteen years of this period, from January 1, 1890, to June 18, 1904, only 42 cases were admitted with the diagnosis of tumor, and of these in only 3 were fairly careful perimetric charts plotted, the tests for visual defects in the other cases amounting to nothing more than rough finger observations. The results in these cases are therefore negligible.

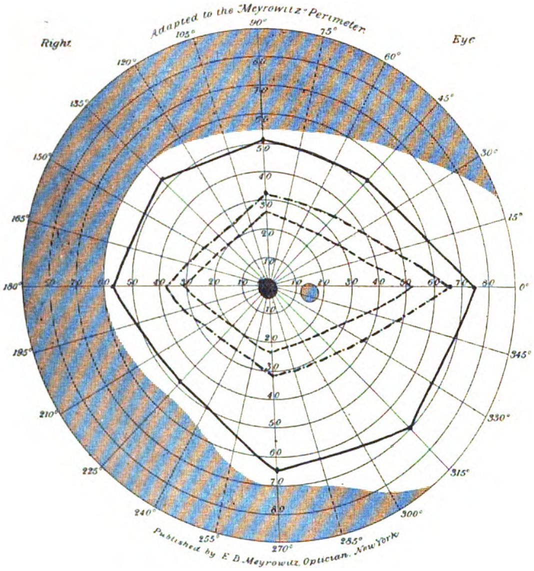


Fig. 1.—Chart October 18, 1910. Showing what was regarded as an indication of practically normal field relations. Note that eight points were relied upon for the form field and only four for both blue and red.

Since June 18, 1905, to the present writing, January 1, 1911—approximately a period of five years—the 200 cases which form the basis of the present report have come under observation, and with only one or two exceptions they have been surgically treated. The rapid increase in the number of these patients may be judged from the fact that 82 out of the 200 have been admitted for treatment during the past twelve months.

It has been possible to plot reliable perimetric charts in 123 out of the 200 patients, 61.5 per cent, repeated observations having been made in the majority of the 123 cases. In the remaining 77 cases of the series no examinations were possible, or records were made which were too cursory to be of value from the standpoint or our present studies. These cases deserve a word in passing.

Cases in Which Perimetry was Omitted or Precluded.—The examination was precluded owing to blindness in 19 cases.[6] The patients were too young to permit of anything more than rough tests in 13 instances. In 28 they were unconscious, aphasic or too ill and having too much vertigo for reliable perimetry, though in a number of these cases subsequent post-operative tests were possible. Nine patients were operated upon out of town, and the fields, if any, which ac-

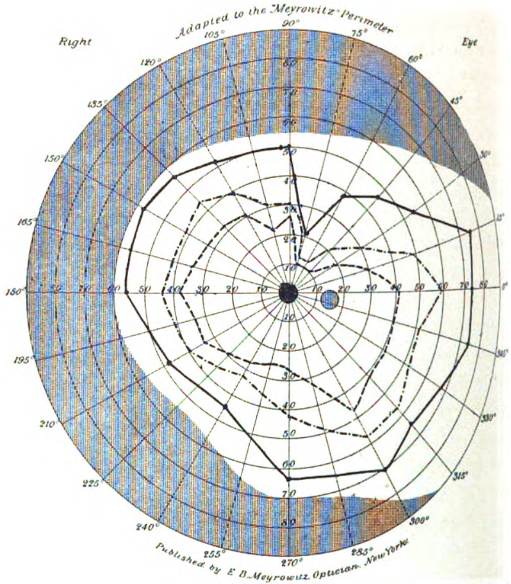


Fig. 2.—Chart October 19, 1910. Corrected chart disclosing upper right temporal defect indicating destruction of some lower fibers of Meyer's loop of the visual pathway in left temporal lobe. Points taken at every 15 degrees for form and nearly as frequently for blue and red. Note the striking difference of color field configuration in the two charts.

---

[5] Unless otherwise stated on the legends or case reports throughout this series of papers, discs of 0.5 mm. have been used in the making of the charts, and the outer boundary records the form field rather than that for white. We have usually confined our color observations to blue and red. The green field, though occasionally charted, we have found to be less useful for our purposes, and it has not been included in the charts reproduced in this series of papers.

[6] That 11.6 per cent of all of our cases coming for operation are blind from atrophy secondary to a choked disc is a commentary on the present indecision of physicians in regard to the surgical nature of brain tumors. It is encouraging to note, however, that in the last 100 cases there were only 7 patients who were blind at the time of admission—contrasting favorably with the 12 blind patients in the preceding 100 cases.

ame holds true for the records of 9 cases for which we are ersonally responsible, the fields having been plotted by uneliable observers and not authenticated, or, owing to the exgencies of the case, either neglected entirely or the examinaion restricted practically to finger tests for form alone.

Cases in Which Perimetry was Possible.—As we have stated, eliable charts were secured from 123 patients. Of this numer 27 showed fields which were practically normal in all espects. There remain 95 cases—nearly one-half of the enire number, and 77 per cent of the cases in which the fields ould be taken—which displayed abnormalities of diagnostic alue. In 42 cases characteristic defects occurred which were efinitely of aid in localization. The charts of the other 53 ases showed fairly symmetrical interlacing with more or less endency toward inversion of the color fields, accompanied y some constriction of the fields for form—an indication of n increase of pressure. These three subdivisions deserve ome further analysis.

1. *Normal Fields.*—As stated, these were observed in 27 of e 200 cases (13.5 per cent), and it is interesting to note at practically all of them occurred in the second one hundred ases of the series—an evidence of the growing tendency ward more precocious diagnoses before symptoms have adnced to a high degree. Naturally, normal fields will more ten be observed when the tumor primarily involves an area hich promptly gives localizing symptoms. This is particurly true of early pontine tumors (2 cases); of many tumors hose first symptom is Jacksonian epilepsy (7 cases); of early tracerebellar or lateral recess lesions (6 cases), and parcularly of early hypophyseal growths or hyperplasias which ve not reached the point of giving either general pressure or rious neighborhood symptoms (7 cases).

A few of these 27 cases with normal fields showed an early ge of hyperæmia of the nerve-head. This, however, was the ception. In most of them there was neither interlacing nor suspicion of œdema of the papilla.

The diagnoses of tumors which, on the other hand, originate relatively silent areas of the brain will naturally depend re often on the existence of general pressure symptoms, imtant among which are more or less outspoken perimetric iations. As a matter of fact, the mere enumeration of the centage of choked discs which have been observed in a en series of tumor cases is apt to mislead; for the figures ich are often given, varying from 70 to 80 per cent, depend rely upon the stage of the disease at which on an average patients have come under observation. And this hereto has usually been an advanced stage. With the few extions of cases in which the growth primarily originates in near some vital center in the brain stem causing sudden th before general pressure symptoms occur, all brain ors may ultimately be expected to show a choked disc.

he pontine tumors furnish a good example of this. In various statistical studies on the occurrence of choked as a manifestation of brain tumors attention has been d to the surprisingly low figures in the case of pontine growths. This is naturally accounted for by the fact that from the very situation of the lesion in what may be called the encephalic cross-roads, an early diagnosis is almost certain to be made before pressure symptoms advance to any considerable degree. A tumor of corresponding size in a mute area of the brain would be practically symptomless. Hence it is natural that the existence of a pontine tumor is recognized early, but this does not mean that such a lesion is ultimately any less liable than others to produce a choked disc, except in the case of an early fatality. Indeed, a choked disc would be inevitable in the course of time from compression of the iter and the secondary increase of cerebral pressure due to a ventricular hydrops. The same thing naturally holds true for color interlacing in these cases, and in all of our eight pontine tumors not only choked disc, but color interlacing also—judging from the cases in which it was possible to use the perimeter—has been an inconspicuous or absent feature until late in the disease.

2. *Fields Showing Color Interlacing* (*Dyschromatopsia*).—Interlacing with more or less inversion and constriction of the color fields was the only perimetric abnormality observed in 53 cases (26.5 per cent of the entire series, 43 per cent of the 123 cases possible to examine). If we add to these 53 cases the 16 in which color interlacing accompanied various types of homonymous hemianopsia there are 69 cases of interlacing in the series. Furthermore, if we deduct from the 123 cases the 27 showing normal fields, and about 20 others with complete loss of color vision (achromatopsia), a constricted form field alone being preserved, it will be seen that the 69 cases which showed interlacing before operation represent about 90 per cent of all those in which this type of perimetric deviation could have been expected. For the cases showing normal fields had not arrived at a stage where pressure was sufficient to produce interlacing; while those with achromatopsia had gone beyond it.[7]

---

[7] These figures may be compared with the statistics recorded by Bordley and Cushing (*loc. cit.*) two years ago, 50 out of the series of 56 cases then examined having shown color changes. The present figures (69 out of a series of 123 cases) represent a much lower percentage, due partly to the fact that we are seeing tumor cases much earlier in their course than formerly and also to the fact that the proportion of hypophyseal tumors in the series has increased greatly during the past year and has somewhat modified the percentages.

We are aware that many have experienced difficulty in recording color interlacing, and the only corroboration, so far as we know, of our results has been given in a note by B. Sachs (*Jour. Am. Med. Asso.*, 1909, p. 316) and in a report by Byrom Bramwell (*Lancet*, March 5, 1910, p. 631). There are of course other conditions which may produce interlacing, many of them associated with pressure or stasis, as enumerated by de Schweinitz in his chapter on the Psychoses and Neuroses in "The Eye and Nervous System" (Posey and Spiller). We have observed an occasional instance of typical interlacing in exophthalmic goitre.

It possibly should be stated that in plotting the charts the boundary points on each radius are determined for both colors at the same moment. If the fields for blue and red should be plotted separately the relationship of their periphery would be less dependable.

In the 200 cases of our complete series there have been 134 supratentorial (cerebral) and 66 subtentorial lesions, a proportion of two to one. In the group of cerebellar cases more or less symmetrical and bilateral constriction with color interlacing is the only perimetric change we can expect; and of the 53 cases which have shown this change alone without a suggestion of an hemianopic defect, naturally a considerable number proved to be cerebellar (certified or suspected) cases—a proportion of three cerebral to two cerebellar.

Without further analysis of these figures it is apparent that interlacing proves to be one of the most constant of the signs of an increase in pressure, and, what is more important, that it is occasionally the earliest of these signs. In a number of instances, as we have indicated, the condition has preceded a demonstrable choked disc, and, furthermore, when accompanied by a choked disc it has been very commonly observed that the inversion and interlacing disappear after decompression before there is any considerable subsidence of the neuro-retinal swelling. Thus, if this type of dyschromatopsia is to be attributed to pressure it appears to be a more sensitive reaction in many respects than the neuro-retinal œdema itself.

The cases in this group of 53 which showed dyschromatopsia, either in the total absence of a choked disc or in company with a very incipient process, will be recorded in some detail in our second paper. At the same time the perimetric changes observed in the outspoken stages of choked disc will be correlated with Marcus Gunn's five subdivisions of this process based on ophthalmoscopic appearances alone.

3. *Hemianopic Fields.*—Definite field defects other than the mere symmetrical constriction or color interlacing—defects, in other words, which are presumed to indicate direct implication of the visual pathway—have been observed in 42 of the 123 cases in which the examination was possible (33.3 per cent); and it may be said in passing that in a considerable number of the 77 patients in whom the taking of the fields was precluded, the pre-existence of gross hemianopsia of one form or another was indicated by the histories, or the patients may actually have brought suggestive fields taken elsewhere before blindness came on.

In this group of 42 hemianopsias we have included 12 cases of fairly typical binasal hemianopsia. Though the analysis of the cases exhibiting this type of defect will be reserved for the third paper in this series, it may be stated here that in all the condition accompanied an advanced choked disc, often with complete achromatopsia—cases in which merely a constricted temporal field was preserved in each eye. It will be observed that these binasal hemianopsias most often occur in cases of subtentorial growths which have led to a symmetrical change in the two nerves due to secondary atrophy without any direct implication of the visual pathway itself. Thus in considering the prevalence of the true hemianopsias in a given series of intracranial tumors, one should exclude from the list the subtentorial lesions, which are barred from the possibility of direct implication of optic tract and radiation.

In the 200 cases there were 66 (presumable or certified) subtentorial, including pontine, growths; and 38 of these are included with the 123 cases in which the fields were examined. This leaves only 85 cases with cerebral (presumed or certified) lesions subjected to perimetry, and in 30 of them (36.5 per cent) the perimeter has shown what may be interpreted as a direct implication of the visual pathway.

Granting therefore the common occurrence of form and color defects from pressure involvement of the topic tracts and radiation in cerebral tumors proper, of what localizing value are these defects other than to place the lesion in the right or left hemisphère—a simple matter which is usually determinable by other signs? We shall see, however, that the configuration of the homonymous defect is actually of considerable help in determining the situation of the lesion, whether fore or aft and whether above or below the visual pathway in the hemisphere obviously involved.

Our 42 cases of hemianopsia may be subdivided into three main groups: (1) those exhibiting a definite tendency toward a complete binasal loss of vision with some preservation of the temporal fields—the 12 cases of which we have already spoken; (2) those showing a fairly characteristic tendency toward a bitemporal blindness—6 cases; (3) those with an homonymous defect, whether vertically total, quadrantal or, what is far more common, but just as valuable for diagnostic purposes, a fragmentary homonymous constriction—24 cases; and a few illustrations of superior hemianopsia must be included.

Modern decompressive measures for unlocalizable or inaccessible lesions give a definite prolongation not only to the life of the patient, but at the same time to the life of the tumor; and inasmuch as vision under these circumstances should be preserved (and will be unless procrastination has permitted an advanced secondary atrophy) the enlarging growth, if supratentorial, will, in all probability, in the course of time encroach on the geniculo-calcarine pathway. Hence in the future if the perimeter is not neglected we shall doubtless observe among our tumor cases a much larger percentage of hemianopic defects than we have recognized in the past. When we realize the vertical breadth and the antero-posterior course of these fibers it is readily seen that every tumor of the cerebral hemispheres, with the exception of those situated in frontal or superior parietal regions, may at some time in the progress of its enlargement be expected to exert at least some pressure effect on the upper or on the lower portion of the radiation; and whether this shows itself as a beginning homonymous defect in the upper or in the lower part of the field may be of the utmost value from a localizing standpoint.

The hemianopsias which occur as the result of hæmorrhage or softening secondary to vascular disease, are apt to be as sharply cut as they are abrupt in onset, but in the case of tumors the perimetric deviation is a slowly progressing one and is more or less complicated in many instances by the constriction of the fields consequent upon the alterations secondary to an accompanying choked disc. Hence it will be seen when we come to discuss the tumor hemianopsias that the clear-cut vertical meridians which are usually regarded as requisite to the diagnosis of this condition are conspicuously accompany the case descriptions represents erely a "tendency toward" an hemianopic defect—sug- stive alterations in the field boundaries, in other words, ich are as clearly indicative of involvement of the right left pathway as though the defect were vertically complete. deed, these suggestive homonymous or bitemporal constric- ons may be registered by defects in the color fields alone, as ll be subsequently pointed out.

As the alterations which lead up to the typical hemianopic ld defects are progressive, it behooves us to recognize them their early stages, and the opportunities offered the operat-

patients as their symptoms advance before operation and subside afterward, should give him especial facility in interpreting these states.

Summary.—In a series of 200 cases of brain tumor it has been possible in 123 cases to secure reliable perimetric charts. These have shown (1) normal fields in 27 cases; (2) simple color interlacing or inversion (dyschromatopsia) with more or less constriction, but without other field distortion in 53 cases, and (3) hemianopsia, or a tendency toward this defect, in 42 cases.

NOTES ON NEW BOOKS.

odern Treatment: The Management of Disease with Medicinal and Non-Medicinal Remedies. By Eminent American and English Authorities. Edited by Hobart Amory Hare, M. D., Professor of Therapeutics and Materia Medica, Jefferson Medical College, Philadelphia, etc.; assisted by H. R. M. Landis, M. D., Medical Director to the Phipps Institute for Tuberculosis and Physician to the White Haven Sanatorium. Two octavo volumes, 1800 pages, with numerous engravings and full page plates. Price per volume in cloth, $6.00. (*Philadelphia and New York: Lea & Febiger, Publishers, 1911.*)

Handbook of Practical Treatment. In three volumes. By 79 eminent specialists. Edited by John H. Musser, M. D., Professor of Clinical Medicine, University of Pennsylvania; and A. O. J. Kelly, M. D., Assistant Professor of Medicine, University of Pennsylvania. Volume 1: Octavo of 909 pages, illustrated. Per volume, cloth, $6.00. (*Philadelphia and London: W. B. Saunders Company, 1911.*)

The appearance of these two works at practically the same ne by two of the leading medical publishing houses shows the irit of competition which exists in this business as well as in many other active ones. For the moment, Lea & Febiger have e advantage, since both their volumes have appeared, while but o of Saunders Company are as yet published. "Practical Treat- nt" will in the end be the larger work by nearly 900 pages, the first volumes of both publications are practically identical t only in size but in general appearance. The similarity be- een these two publications goes still further, as a few writers ve contributed to both systems. There is one rather striking ture in "Practical Treatment," the appearance of a number articles by surgeons, a feature which, on the whole, seems advised in such a work. The doctor in contradistinction to surgeon is usually the better therapeutist of the two, and in h works, which are not intended to take up surgical treat- nt, it seems as if it would have been better to have all the icles written by doctors. Otherwise the list of contributors oth works is well selected, and in purchasing one or the other k there is little to choose. It is six of one, and half a dozen he other. In two such systems there can be but little differ- e, when both are ably edited as in this case, except in the ngement of the articles, a perfectly minor point, for after whether the treatment of one set of diseases is in the first or nd volume is of no consequence, and such differences exist. dern" or "Practical" Treatment, call it which you will, is amentally the same in America; different practitioners will slightly varying methods of treatment, but from East to t or from North to South the well-trained doctors practice same methods generally. Some will not agree on a milk or re liberal diet in typhoid fever, as to which is the best, or the values of hydro-, electro-, and mechanotherapy in various diseases, but none the less the basis of all treatment is the same everywhere in this country at least, and the young practitioner will find the pros and cons for the varying treatments exposed in both systems. So both are to be recommended and both will be found serviceable guides. The articles are all written by well-known practitioners, and differences of opinion as expressed in one or the other work will but serve to stimulate the reader to further thought on his own part.

Inebriety: A Clinical Treatise on the Etiology, Symptomatology, Neurosis, Psychosis and Treatment and the Medico-Legal Relations. By T. D. Crothers, M. D., Hartford, Conn. (*Cincinnati, Ohio: Harvey Publishing Company, 1911.*)

No one can overestimate the value to mankind of all honest efforts to solve the social, economical and moral problems which result from alcoholic excesses and addictions; and hence all books like the one under review deserve careful consideration at the hands of the reviewer. The author of this volume has been actively interested for many years in the study and treatment of inebriety and should by experience and knowledge be well fitted to give to the profession much valuable knowledge. The scope of the work is ambitious and the author has collected his material with great industry. The work, however, is not a strictly scientific one, but is rather a popular treatise. The central thought in it seems to be that inebriety is at all times and under all circumstances a physical disease and clinical facts and plausible theories seem to combine throughout the work to establish the truth of it. Unfortunately the evidence to this effect has not always been gathered with the care which seems to meet the requirements of scientific accuracy. Clinical facts are loosely stated and broad generalizations are often made from inadequate premises. Take a single unimportant example which may be cited to show the attitude of the author. He says in speaking of the causes of inebriety: "The evidence from the history of many cases shows that excessive cigarette smoking is followed by inebriety." That excessive cigarette smoking, like many other excesses, is frequently a concomitant of inebriety, is not to be doubted, but it is nothing more than this. What evidence can be produced to establish any causal relation between cigarette smoking and inebriety? The same lack of scientific precision is noticeable in the author's clinical histories which for the most part are dogmatic statements, of conclusions which seem to have been reached oftentimes as the confirmation of previously accepted theories rather than the presentation of clinical data.

As to the author's contention that inebriety is solely a physical disease, many queries suggest themselves. If it is a disease, has it a definite course, well-recognized symptoms and an established method of treatment? The causes of inebriety differ with individual cases. The pathological appearances after death are not invariable. Many inebriates go down to early death in spite of all efforts to arrest the course of the malady. Others, as the author points out, get well spontaneously; "the craze for alcohol at times dies out of itself from causes unknown," as he expresses it. Inebriety seems a condition characterized by a depressed state of the nervous system due to drink and to other causes often physical, mental or moral, sometimes to all of them combined. The author's remarks on treatment seem judicious and well-calculated to assist the physician who seeks knowledge upon this point. The chapters entitled "Inebriety as Noted in Ancient Civilization" and "Medico-Legal Questions" are of much interest.

Diseases of the Anus, Rectum and Sigmoid, for the use of Students and General Practitioners. By SAMUEL T. EARLE, Professor Emeritus of Diseases of the Rectum in the Baltimore Medical College, etc. (*Philadelphia and London: J. B. Lippincott Co., 1911.*)

Following the custom usual to text-books of this type, Dr. Earle devotes the first chapter of his work to a review of the chief facts concerning the anatomy and physiology of his chosen field. Then a very practical presentation of general technical questions—methods of examination, anæsthetics, equipment, etc.—is given. The first abnormal condition discussed is that ever obtruding subject, constipation; and its forms, causes and symptoms are considered at length. From the limitations of the author's subject, the operative treatment of constipation directed at the intestinal tract oral to the sigmoid receives no attention. It is of interest to note that Earle attaches less importance to lesions of Houston's valves, as a cause of constipation, than certain other proctologists are inclined to attribute to such conditions.

Diseases of an inflammatory nature, embracing such frequently encountered conditions as ulcerations, perirectal abscesses and fistulæ, of course constitute an important division of the subject-matter of such a book, and this general group is handled in a manner sufficiently full, and yet free from the tedious reiteration so often inflicted on the reader. A reflection of the present interest in sigmoiditis and diverticulitis is found in the author's treatment of these subjects. Here and elsewhere in the book, apt and frequent citations from original sources are a noticeably valuable characteristic. Congenital anomalies, fissure, stricture, and pruritus ani, are each the subject of a chapter in which the accepted facts are set forth in a readable way. One naturally does not turn to such a book, specifically addressed to students and general practitioners, for contributions to the advancement of the subject, but rather for a resumé of the present consensus of opinion; nevertheless to many readers, especially to surgeons, perhaps the chief interest of the book lies in the chapter on hemorrhoids, where Earle's own method of operating is described.

Conditions demanding larger surgical procedures, such as prolapsus of the rectum, new growths, and extensive injuries, receive the emphasis to which their importance entitles them, and the text is reinforced by numerous good illustrations. Throughout the book, the writer manifests his interest in the pathology of the various lesions, and numerous illustrations of gross and microscopic specimens are given. The last two chapters, devoted respectively to diseases of the coccyx and Herschsprung's disease, while not strictly within the scope of the work, are so closely allied to it that they require no apology, but distinctly add to the completeness of the volume.

In the preface, Dr. Earle says: "The maladies discussed are very common and very stubborn. My chief care has been to include the most recent and effective methods of cure, and to give these comprehensively and succinctly." In this purpose the writer has distinctly succeeded, as the generally accepted facts and theories are well presented, and there is a noteworthy absence of the repetition of commonplace case-reports and details of technique so frequently encountered. At the risk of seeming captious, one might wish for a more definite ring of authority in some places, and another minor point for criticism is afforded by occasional involved sentence-construction which somewhat obscures the meaning. On the whole, however, the book fulfils the purpose for which it was conceived very well. A touch of personal interest to the Johns Hopkins Medical School men lies in the dedication of the book to Dr. Councilman and the citation of opinions of Dr. Welch, with both of whom Dr. Earle worked as a post-graduate in pathology.

Differential Diagnosis. Presented through an Analysis of 385 cases. By RICHARD C. CABOT, M.D., Assistant Professor of Clinical Medicine, Harvard Medical School. 753 pages, illustrated. Price, $5.50. (*Philadelphia and London: W. B. Saunders Company, 1911.*)

The use of groups of cases, each group presenting a distinct symptom, as cough, fever, localized pain, chill, coma, convulsions, weakness, etc., as a basis for a work on differential diagnosis is a new and clever one of the author, and is bound to be most serviceable to many students. It is similar to a clinical conference, where the instructor has gathered a number of patients together who show a more or less common condition, and then differentiated their troubles to his hearers. Those who will use this book intelligently, and before reading the discussion of the cases presented, will try to analyze them for themselves, and then compare their own diagnoses with those of the author, will put themselves through an excellent training. They should first read the introductory pages to each symptom and thus have an anatomical and physiological ground to build upon. There may be errors, as the writer suggests, in his work, but it will only be a brilliant student who will find them, and others will make no mistake in accepting the diagnosis of the author. The work is to be heartily commended as a fresh and attractive method of teaching, and its success will be watched with much interest.

The Blues (Splanchnic Neurasthenia). Causes and Cure. By ALBERT ABRAMS, M. D., etc. Illustrated. Fourth Edition Revised and Enlarged. Price, $1.50. (*New York: E. B. Treat & Co., 1911.*)

The only difference between this edition and the preceding one lies in a brief note amplifying the treatment for this condition. The author believes that concussion of certain of the spinous processes will reduce congestion in the abdominal organs, and so cure "the blues." It would be most fortunate for the human race were this mental condition always due to a physical condition so easily alleviated!

Collected Papers by the Staff of St. Mary's Hospital, Mayo Clinic, Rochester, Minnesota, 1905-1909. Octavo of 668 pages, illustrated. $5.50 net. (*Philadelphia and London: W. B. Saunders Company, 1911.*)

All of these papers have appeared in various medical journals and gathered together in a handsome volume, there is much of interest in them. Most doctors, who have not been to Rochester think of the "Mayo Clinic" as being the two brothers Mayo, but in the list of contributors to this volume there are fourteen names—an indication of what a large clinic exists under that name, and the extent of the work carried on there.

The Johns Hopkins Hospital Bulletins are issued monthly. They are printed by the LORD BALTIMORE PRESS, Baltimore. Subscriptions, $2.00 a year (foreign postage, 50 cents), may be addressed to the publishers, THE JOHNS HOPKINS PRESS, BALTIMORE; single copies will be sent by mail [illegible]nty-five cents each. Single copies may also be procured from the BALTIMORE NEWS CO., Baltimore.

OF

THE JOHNS HOPKINS HOSPITAL

Entered as Second-Class Matter at the Baltimore, Maryland, Postoffice.

ol. XXII.—No. 244.] BALTIMORE, JULY, 1911. [Price, 25 Cents

CONTENTS.

PAGE

ıe Changes in the Circulation in Aortic Insufficiency. (Illustrated.)
By William G. MacCallum, M. D. 197

Further Note on the Clinical Use of Scarlet Red and its Component Amidoazotoluol, in Stimulating the Epitheliation of Granulating Surfaces. (Illustrated.)
By John Staige Davis, M. D. 210

ı Certain Limitations in Interpreting Thyroid Histology.
By David Marine, M. D., and C. H. Lenhart, M. D. . 217

PAGE

Pneumococcus Peritonitis. With Report of a Case.
By Harvey B. Stone, M. D. 219

An Anomalous Duct Belonging to the Urinary Tract. (Illustrated.)
By Paul G. Woolley, M. D. and Herbert A. Brown, M. D. 221

Acute Cholecystitis with Large Amounts of Calcium Soap in the Gall-Bladder. (Illustrated.)
By John W. Churchman, M. D. 223

Notes on New Books 224

THE CHANGES IN THE CIRCULATION IN AORTIC INSUFFICIENCY.

By William G. MacCallum, M. D.,
Professor of Pathology, Columbia University.

(From the Department of Pathology, Columbia University, New York.)

In the case of lesions of the aortic valves, which cause them be insufficient, there occur certain well known symptoms hich are perhaps more characteristic than those following ıy other valvular lesion, and have been very minutely studied. ırticularly striking are the collapsing pulse and the diastolic urmur with the hypertrophy of the heart, and especially of e left ventricle which follows. Ordinarily these things have en explained as being due to the regurgitation into the left ntricle of a portion of the blood thrown out at each systole, d this explanation has generally been regarded as satis- tory until recently when H. A. Stewart[1] in a study of this ıdition brought forward the problem as to the real cause the fall of pressure therein and the significance of the po- on of the dicrotic notch in the pulse curve.

)f course when the heart has become hypertrophied, differ- conditions may prevail, and so, too, when other lesions of heart or of the arteries exist, the simple impairment of the ulation resulting from the lesion of the aortic valves is ured. It is necessary, therefore, to study the effects of ic insufficiency produced in a normal animal, and this can y be done, as in the work of Stewart, by tearing a segment he valve with the valvulotome described in an earlier r.[2]

Stewart confirmed the statement of Mackenzie, Broadbent and others that the dicrotic notch holds a position very low in the descending arm of the pulse wave, when there is aortic insufficiency, whereas it is normally above the middle of this slope. Since the dicrotic notch is normally found to be synchronous with the end of the systole, and since the dicrotic notch in aortic insufficiency occupies a position approaching the trough of the pulse wave, he concludes that the collapse occurs for the most part during the latter part of the systole. There can therefore be no regurgitation during that time and the collapse must be due to widening of the arteries and ready escape of the blood. A similar position is occupied by the dicrotic notch in the pulse of low arterial pressure. If the pressure is raised by compressing the aorta or by giving adrenalin, or, if from the existence of arteriosclerosis, the pressure is high, the dicrotic notch even in aortic insufficiency assumes a higher position and the pulse is no longer regarded as collapsing.

Further, since the diastolic arterial pressure is found to fall on the tearing of the aortic valve, while the systolic pressure is maintained, he argues that there must have been an attendant vasodilatation. Since the pulse pressure has been increased because of the fall in diastolic pressure, it can only have resulted from peripheral dilation.

Such a dilation of the peripheral vessels must constitute a protective adaptation which instantly comes into play upon

---

tewart: Experimental and Clinical Investigations in Aortic ficiency. Arch. Int. M., January, 1908.

acCallum: Johns Hopkins Hosp. Bull., August, 1906.

the tearing of the valve and must be brought about by vasomotor influences. Since this seemed at first sight hard to accept in place of the time honored explanation on the basis of regurgitation, I have examined it more closely. In order to approach these conditions I have devised an arrangement of the circulation, which I find, on looking over the literature, is somewhat like that used by Martin,[3] Howell and Donaldson,[4] excepting in that it does not interfere with the nervous connections of the heart, and is, on the whole, more manageable. I have also found the description of a somewhat similar device by Lohmann[5] in a recent journal.

It is as follows, the aim being to eliminate as far as possible the influence of the vasomotors and to determine directly the output of the aorta in relation to that of the ventricle. In devising a method which will give us the output of the heart under controlled conditions of peripheral pressure we must begin, I suppose, with the idea that such results may not correspond absolutely with those in the normal intact animal, but that when carefully measured before and after the insufficiency is produced, they will give us a clear idea of the changes which depend upon the insufficiency. This is all that one can claim for the results which follow, although as a matter of fact it seems perfectly easy to reproduce under such conditions a state of the circulation indistinguishable from that of the normal animal.

The method used will be made clear by the accompanying diagram (Fig. 1.) In order to eliminate the effect upon the heart of a peripheral resistance such as is offered by the systemic arteries, liable to constant change and difficult to measure and change at will, the aorta is cut through at the arch and connected with a canula and a long rubber tube with a curved glass outlet of the same caliber. This outlet can be set at any height upon the graduated vertical rods. A cistern supported at the same height and movable with the outflow nozzle, contains defibrinated blood usually mixed with Ringer's solution, which, after passing through a coil immersed in warm water, runs through a second canula into the distal portion of the aorta. Naturally, the first blood which escapes will clot and is not emptied into the cistern until it has been defibrinated; but after a short time all the blood in use has become defibrinated and the outflow nozzle may be turned so as to empty directly into the cistern. Then the circulation will go on indefinitely, differing from the normal in that it drops through the open air at one point and there may be caught and measured, and in that the variable peripheral arterial pressure is replaced by an outflow level which may be precisely controlled by merely moving the supporting clamp up and down on the graduated standard. Any necessary manometers may be attached laterally to the rubber tube which represents the aorta. A plethysmograph constructed after the manner of Henderson's but made in a more suitable shape, and of glass so that the heart can be seen, is put upon the heart and connected with a tambour whose movements have been calibrated. This plethysmograph is put into exactly that position in which it allows the heart to lie naturally and then fixed there with a clamped support. Its lower surface is made nearly flat so as not to dislodge the heart nor press upon the great veins.[6] The outflowing blood is caught in a graduated glass cylinder and as the level of the blood rises in the cylinder each 10 cc. is recorded by an electric signal writing on the same drum as the manometers and plethysmograph. All of these pens are exactly superposed.

The table, the height of which can be raised or lowered by a screw, is adjusted so that the heart is on a level with the zero of the graduated uprights which run nearly to the ceiling of the room. Pressure is then estimated in centimeters of blood although it is, of course, easy to read it off in millimeters of mercury from the curves. A Jacquet chronograph accompanies the manometers.

It is clear that a constant error is involved in estimating the total output, because although the subclavian arteries can be ligated, the carotids must be left open. Of course, one might arrange a separate circulation for the head, but the error is constant enough to make little difference in the result obtained. It involves a constant difference between the estimated value of the plethysmographic excursion and the measured output per beat. Part of this may be residual blood, but part is blood escaping into the carotids.

In introducing the canulas into the aorta it has been found advisable to open the subclavian artery and allow free bleeding while the aorta is clamped in order to relieve the strain upon the heart. When the animal is thus arranged, the pressure against which the heart expels blood into the aorta is determined by the position of the outflow tube. The pressure of the blood entering the distal portion of the aorta, and consequently the amount of blood finally supplied to the heart, depends upon the height at which the cistern is placed. If the cistern is maintained at a constant height and the outflow tube moved up and down, it is found that the actual output of the heart through the aorta is changed but little by the alterations in pressure, as pointed out by Howell and Donaldson. It seems, however, that when the cistern stands far above the outflow tube, a certain amount of blood must run through the animal to the outflow by the force of gravity.

Ordinarily the elevation of pressure in the intact animal is produced by narrowing the arterioles which would undoubtedly tend to affect the amount of blood entering the veins; but apparently this is exactly compensated by the increased force and consequent rapidity with which the heart sends the blood through the narrow channels and the circulation proceeds as

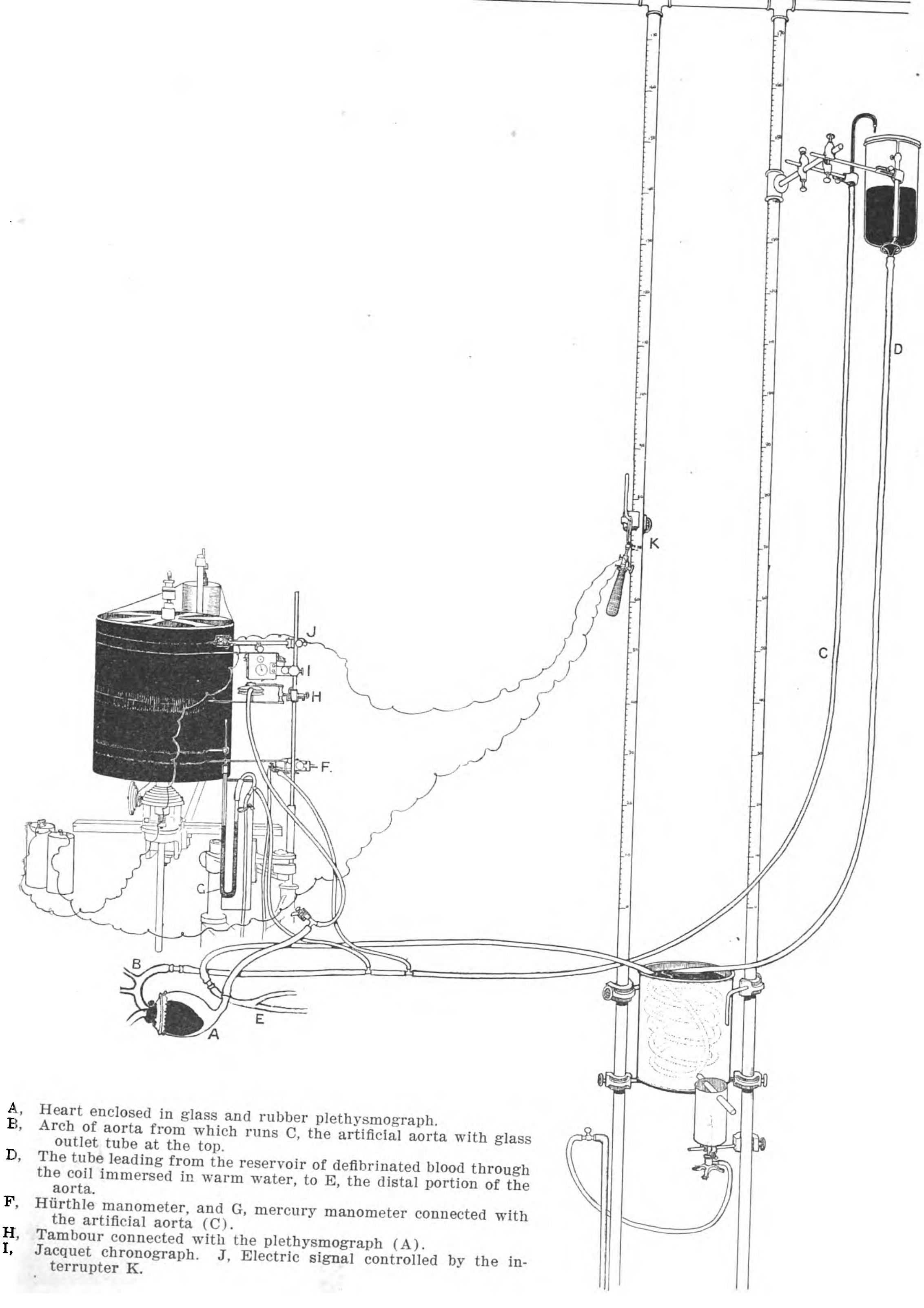
---

[3] Martin: Philos. Trans. Roy. Soc., 1883, p. 663.

[4] Howell & Donaldson: Philos. Trans. Roy. Soc., 1884, part 1, p. 139.

[5] Lohmann: Pflüger's Archiv, 118, 1908.

[6] The tambour of the plethysmograph may be calibrated, of course, by attaching it to a flask into which a burette allows fluid to drop 1 cc. at a time, but it is much more readily and exactly done with a syringe. One cc. or 5 cc. of water is expelled from the syringe into a graduate and the ring on the piston rod then screwed down tight on the top of the syringe. After this the excursion of the piston is 1 cc. or 5 cc. as arranged and it is quite easy to communicate this to the tambour. It can be done rapidly and produces a curve like that obtained from the heart.



A, Heart enclosed in glass and rubber plethysmograph.
B, Arch of aorta from which runs C, the artificial aorta with glass outlet tube at the top.
D, The tube leading from the reservoir of defibrinated blood through the coil immersed in warm water, to E, the distal portion of the aorta.
F, Hürthle manometer, and G, mercury manometer connected with the artificial aorta (C).
H, Tambour connected with the plethysmograph (A).
I, Jacquet chronograph. J, Electric signal controlled by the interrupter K.

before. So, too, it is found that if the cistern and outflow tube are kept at the same level, the outflow and inflow are about constant and thus probably resemble more closely the conditions in the intact animal than when the inflow is kept constant and the level of outflow changed. Nevertheless, both conditions were studied in many curves.

When the level of the cistern and of the outflow were the same, the elevation of these increased the rate of the circulation. The amount of blood thrown out of the aorta per beat increases with the elevation; consequently, the amount of blood handled by the ventricle increases, the ventricle dilates and its excursion increases. It not only relaxes to a greater degree, but it contracts and empties itself completely. Thus the plethysmographic curve not only shows an increased excursion, with heightened pressure of this sort, but occupies a position further below the base line. This is the usual criterion of the tone of the ventricle, but if we disregard the conditions of malnutrition of the myocardium, of which we shall speak later, it seems that such accommodative dilatation, associated as it is with an improved excursion and the easy performance of increased work, should hardly be referred to as a diminution of tone. This, however, is a question of definition, and we hope to say more at another time of the question of tone. In practice, the plethysmograph was opened at each change of pressure so that its excursions, when again closed, were executed directly about the base line. In this way, calibration is less complicated and the disturbing element of the compression of the air in the plethysmograph was eliminated. When this was not done, however, it was found that at a pressure of 150-200 cm. of blood, the heart would make very great excursions at a level far below the base line, ejecting blood very rapidly, while at low pressures the heart became very small and made small excursions at a level far above the base line with relatively slight output of blood (Curve I). This seems to be chiefly dependent upon the amount of blood handled, for when the cistern was kept at a constant level, the excursions varied far less.

The character of the normal pulse may be studied in the curve of the Hürthle manometer taken from the aorta laterally. It might seem that the substitution of gravity for the resistance offered by friction in the arterioles might produce fallacies in the interpretation of the pulse curve, but after all, the elasticity of the arteries, represented here by that of the rubber tube, is the only force which forms the pulse aside from the peripheral resistance and the impulse from the heart. As a matter of fact, experiments were made to test this both in the normal intact animal and in those in which aortic insufficiency had already been produced, and it was found that the pulse curve, after the cutting of the aorta and the establishment of the new arrangement, was indistinguishable from that of the intact animal of five minutes before, as may be seen in the accompanying curves (Curve IX).

It might be thought that in the intact arterial tree it would be easy for the elastic contraction of the artery to continuously propel blood along into the veins, whereas in the upright rubber tube, the expulsion must depend upon the impulse of the heart alone; but a moment's reflection will show that with the cessation of the systolic impulse and the escape of blood over the level of the outflow, the level of the blood is still exactly there, and if the elastic tube is overdistended its recoil will drive more blood over, precisely as in the case of the arterial tree with its capillaries.

The pulse curve shows the dicrotic notch and wave precisely as in the intact animal. The position of this notch changes with changes in the level of the outflow, being low on the slope when the outflow is low and rising toward the summit of the primary wave, as the outflow tube, and consequently the pressure and tension of the wall are elevated.

It is difficult for me to believe that the form of the pulse wave can be directly dependent upon the rapid escape of the blood from the arteries. If the tube into which the heart ejects blood is elastic, and of any considerable length, even if it be widely open at its end, it will require an appreciable time for the blood to pass along and escape, and it seems probable that even in such a case the pulse wave will reach the end of the tube before the actual mass of fluid, the injection of which produced that pulse wave, does so and escapes.

Even if the elastic tube be of uniform caliber throughout, I do not believe that the form of the systolic pulse wave could be affected by the actual escape of the fluid, for it is certainly formed before that, if the tube is of any considerable length. To attain such a condition, the aorta would require to be like a very short, very widely open straight tube with rigid walls. Far less, then, does it seem possible that the arterial tree as it exists could afford such conditions even with the maximal conceivable dilation of the arterioles.

On the other hand, although it cannot be conceded that the systolic quantum of blood could get out of the way rapidly enough to produce a change in the form of that systolic wave (since the wave is an expression of pressure and not of the movement of fluid), it is obvious that its rapid removal will leave the vessel partly empty with relaxed walls when the time arrives for the next systolic impact; and it is this relaxed condition of the wall, I think, which causes the peculiar form of the pulse in aortic insufficiency.

Stewart has explained, on the basis of the work of Haycraft, Lewis, Roy and others, how the collapsing character of the pulse is dependent upon a low diastolic pressure, high systolic pressure and therefore high pulse pressure not being necessary. I may quote a paragraph: "From the figures given by Roy of the extensibility of the arterial walls at different pressures, two pulse curves are drawn (Fig. 35). In both instances the excess of systolic over diastolic pressure is the same, viz: 60 mm. Hg. but they differ in that in one the diastolic pressure is below normal, viz: 50 mm. Hg. while in the other it is somewhat above normal, viz: 80 mm. Hg. In the lower curve the amplitude is double that in the upper, the angle between the upstroke and downstroke is more acute, and the dicrotic notch relatively lower. In the upper curve, upstroke and downstroke are oblique and the angle between them is widened. In the curve taken at the low pressure there is more movement of the arterial wall for the same change of pressure. The one

It seems that with low pressure the amplitude of the pulse is increased chiefly by the facile yielding of the lax wall of the incompletely distended artery so that the relative position of the dicrotic notch is due to the increased excursion of the vessel wall above that point in the curve at which the end of the systole is indicated by the dicrotic notch.

It can be readily shown that the actual amount of blood which escapes when the heart is working at a low pressure is less than that when the heart pumps against a high pressure because the amount supplied to the heart is less. In other words, the rate of the circulation becomes greater at the higher pressure, at least up to a certain optimum, but this seems to have nothing to do with the character of the pulse except in that, at the high pressure, the walls of the artery are under high tension while at a low pressure they are lax. At high tension the systolic pressure would not be able to expand the vessel so far by its sudden impulse before the closure of the valves and therefore the dicrotic notch would appear after only a slight systolic fling, whereas if the pressure during diastole is low and the walls of the vessel lax, the same systolic impulse

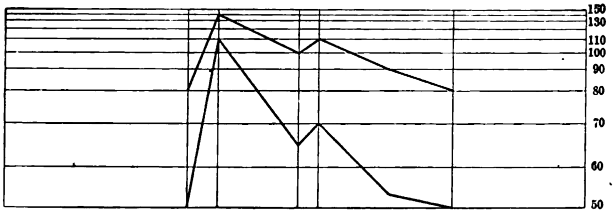


Fig. 35.—Diagrammatic representation of two pulse curves indicating the same pulse pressure, but at different diastolic pressures. The horizontal lines indicate the extensibility of the artery at given pressures (after Lewis).

ould produce a considerable fling before the dicrotic notch hich would therefore stand relatively low on the downward ope. Measured from the trough of the wave the dicrotic otch might stand equally high in a collapsing and a non-llapsing pulse, but in the collapsing, the excessive excursion ove this would make the dicrotic notch relatively low. This especially strikingly seen in the tremendous collapsing pulse hich occurs when the heart is dying from inadequate coronary rculation. The slow but violent systoles throw a quantity blood into the relaxed almost empty artery and a great fling sults before the dicrotic notch.

This gives a ready explanation of the change in the char-ter of the pulse when the aorta is compressed or adrenalin en. These measures increase the tension of the arterial ll by preventing the outflow and it is this increased tension ich changes the form of the pulse. In the case of arterio-erosis in which aortic insufficiency is said not to produce a ical collapsing pulse, it seems more probable that the dity of the artery wall prevents its being distended by the olic impulse even more effectively than a heightened tension insufficiency produced by tearing the valve the dicrotic notch may be quite high on the downstroke of the curve if the pressure is maintained at a fairly high level, it is often very indistinct and one receives the impression that the imperfection of the valves prevents its proper formation.

In the arrangement of the circulation described, the position of the outflow tube determines in a way the pressure. As long as the tube is full to the outflow level, that level represents the diastolic pressure. If the valves are intact the heart responds and maintains the level, but if its nutrition suffers, it dilates and the blood level falls rapidly in the tube. If the aortic valves are torn, the level is maintained but by more active work on the part of the heart. The systolic pressure rises above this, dilating the tube as shown by the summit of the pulse wave which passes along to the outflow.

If, in the animal with an artificial aorta, the outflow tube be set at any level and aortic insufficiency be produced, the pulse pressure instantly becomes greatly increased. There is nothing to represent the supposed accommodative widening of the peripheral vessels here and the outflow from the end of the tube per beat is practically always just what it was before, but still there is greatly increased pulse pressure both from systolic elevation and diastolic fall. The only possible explanation of this is the existence of regurgitation. This relaxes the tension of the wall of the vessel which then receives with the next systole the regurgitated blood together with the normal output. Since the amount of the regurgitated blood again sinks back, the actual outflow is the normal; but the impact of the whole mass thrown out by the heart on the relaxed arterial wall gives the collapsing character of the pulse wave, and the fall in the diastolic pressure must be due, not to a peripheral escape, but to an escape into the heart.

If the level of the outflow tube is high and a high systolic tension thus allowed, the systole will take place into a tube already tense—no great fling or sudden distension will be produced before the end of systole and the dicrotic notch will therefore be at the bottom of only a relatively small part of the downward slope. If the outflow tube be at a low level, less blood will reach the heart from the low cistern, less effort will be made to handle it, less will be thrown into the vessels whose size and elasticity are constant, and the lax wall will be given a fling which leaves the dicrotic notch low.

Another possible explanation of the position of the dicrotic wave lies in the fact that when the valves are torn they can hardly give rise to such a sharp wave or notch and that it may well be that the recoil is from the wall of the ventricle rather than from the valve. Indeed, in many of the curves of extreme insufficiency, it is difficult to discern anything of the dicrotic wave at all. This is especially suggested by the auscultation of the murmur, for although, of course, any such method must be inexact, one is much inpressed by watching the formation of the curve in a slowly beating heart with low dicrotic notch or hyperdicrotism following aortic insufficiency with the finger and the stethoscope on the heart. The murmur starts precisely with the end of the systolic heave and persists through the downward slope to the trough or notch where it stops—the hyperdicrotic wave is executed in silence and then begins sharply the new systole (Curve VI).

On the whole, it seems that the position of the dicrotic notch is chiefly a question of the tension of the vessel wall. Similarly the collapsing quality of the pulse must be a question of the incomplete filling of the aorta just prior to systole and the consequent fling of its lax wall by the injection of the systolic quantum.

I can readily understand that long continuance of this condition might widen the arteries and thus possibly account for the capillary pulse which would be the more easily brought about by the impulsion of an excessive quantity of blood into the aorta even though that blood never reached the periphery. Indeed it is not hard to believe that with hypertrophy of the ventricle the blood might be sent more rapidly through the veins. *But all of these things are the final effects of the changes resulting from aortic insufficiency and not their causes.*

By means of the rearrangement of the circulation with the artificial aorta, it is possible to arrive at some mathematical conclusions as to the exact nature of the mechanism of the blood flow in aortic insufficiency, for it is easy to estimate the output from the aorta at each beat of the heart and at the same time to measure the output from the ventricle as calculated from the calibration of the plethysmographic tracing. When the valves are intact, these two figures are not far apart. A constant error lies in the escape of blood into the carotids, and nothing more than a comparison of the relations before and after insufficiency is attempted. When the valve is torn, it is found that the systolic pressure as shown by the manometers is maintained. The diastolic pressure sinks, the output per beat or at least per minute (for the rate may change and become slower) is about the same, the plethysmographic curve maintains its level or stands a little higher—its excursions are greatly increased in amplitude. These things are true of the artificial aorta and I find them true also of the animal with intact aorta, although Dr. Stewart finds no marked increase in the plethysmographic excursion. In a few experiments made to determine this point I have found an increased plethysmographic excursion exactly as in the cases with the aorta cut.

It must be borne in mind, however, that if there be regurgitation into the ventricle, the amount of blood actually circulating round to the heart will tend to be less than normal, while the volume of the left ventricle will be increased by the reception of the regurgitant blood. The volume of the right ventricle, will, however, be correspondingly decreased on account of the smaller amount of blood it receives. Such a combination might conceivably proceed without on the whole any enlargement of the heart and in that way account for the high level of the plethysmographic curve.

Before the insufficiency, the amount expelled per beat from the aorta nearly equals that put out by the ventricle, but immediately upon tearing the valve there arises a great discrepancy. The excursion of the cardiac plethysmograph becomes much greater, showing a much larger output, while the aortic delivery remains practically unchanged—undoubtedly therefore, at each beat a considerable quantity of blood is thrown out of the heart into the aorta which never reaches the outflow orifice. It must go back into the heart and be thrown out again in the same futile way at the next systole. Even at such low pressures as 30 mm. Hg. this "residual" blood may be three times as much after the lesion as it was in the normal heart at pressures of 60 or even 100 mm. Hg.

There is thus a considerable regurgitation, and when a regurgitation of 1 or 2 cc. is spoken of in a dog it is by no means insignificant, for repeated studies of the output per beat at normal pressures in dogs show that quantities such as 10-12 cc. per beat are far too great and that the dog's heart actually puts out quantities nearer 2 cc. per beat when the dog weighs 7 or 8 kg.

The estimation of the work of the heart at any given level of aortic pressure as the product of the plethysmographic excursion and the rate shows us that there is a sudden great increase when the aortic valve is cut. Thus, in one experiment in which the pressure in the aorta was 120 cm. of blood, the work of the ventricle per minute was represented by 348.4 cc. of blood as compared with 220.9 cc. before the valve was torn, although the actual output from the aorta during this time was only 228 as compared with 203 while the heart was intact. This difference is evidently to be accounted for entirely by the regurgitation of the blood and the hypertrophy of the ventricle is, in the same way, easily accounted for as the result of the excessive amount of useless work put upon the ventricle by the imperfection of that mechanism which normally secures and renders permanent the effect of each contraction.

Positive efforts to make clear the nature of the collapsing pulse may easily be made with this modified arrangement of the circulation. It seemed possible that the mere excess of blood from whatever source which the ventricle was called upon to handle, might stimulate its walls to more violent contractions and thus heighten the pulse pressure. To test this, blood was led from another cistern at a rather higher pressure into the left ventricle through a glass tube which was introduced in one instance through the subclavian artery and between the aortic valves in a heart in which no valve had been torn, and in another experiment on a normal dog the extra blood was brought into the ventricle through the same sort of tube which was introduced through the auricular appendix and the mitral orifice into the ventricle. In both cases the valves closed snugly about this tube and there was no leakage. In both experiments the result was merely a slight elevation of pressure and a considerable increase in the aortic output (largely due, no doubt, to gravity). Nothing of the collapsing character appeared in the pulse.

On the other hand, when the tube passing into the left ventricle was led, not from a separate blood reservoir at a high level, but from any point along the side of the artificial aorta which was tapped with the aid of a "T" tube, the pulse instantly assumed the collapsing character when the artificial regurgitation was allowed, and as suddenly stopped and returned to normal when that tube was clamped. Undoubtedly [illegible] the heart with a torn aortic ılve. In this curve the height of the dicrotic notch will cor-ꞏspond roughly with the level at which the aorta is tapped.

Again, if in an experiment in which a collapsing pulse has ꞏen produced by tearing the valve, we introduce an artificial ılve into the tube which represents the aorta, the pulse will se its collapsing character, and the more perfectly the valve ꞏts the more nearly will it approach the normal form.

From all this it seems unavoidable to conclude that regurgition plays a predominant part in the whole complex of aortic sufficiency. The ventricle throws out a quantity of blood to the aorta, which is more than naturally emptied and re-xed by the regurgitation of the previous diastole, thus giving great fling to the loose wall. Much of the blood returns to e ventricle being in fact only churned out and back from the ꞏntricle. Still, so great is the new effort that a normal or ꞏarly normal amount of blood may be discharged from the ꞏrta. The great pulse pressure produced in this way is very ıaracteristic and since it persists at all pressures it would seem constitute a specially good criterion of the condition. The latation of the peripheral capillaries at each pulsation must due to the same projectile form of systolic filling of the re-xed vessels.

Conclusions.

1. By means of the arrangement of the circulation de-ribed, it is possible to estimate the work of the ventricle and study the influence of various factors upon it.

2. The tearing of an aortic valve producing an aortic in-fficiency causes the heart to perform an extraordinary amount work, part of which is devoted to the maintenance of nearly normal rate of flow on the vessels, while the remainder is pended upon the forcing out of a quantity of blood which ch time regurgitates through the torn valve.

3. This extensive and violent excursion of the ventricle ꞏether with the effect of the regurgitation produces a very ꞏat pulse pressure with low diastolic pressure and the low ısion of the arterial wall allows a great systolic fling which ꞏupies a relatively large part of the height of the pulse curve l thus causes the dicrotic notch to occupy a low position ich is another characteristic of the collapsing pulse.

The following protocols will show the character of the re-ts obtained by measurements and may be compared with corresponding curves in so far as they are reproduced. It st be emphasized that the figures have practically no abso-value. An approximate idea of the output of the aorta ꞏarying pressures is obtained but there are many sources of ꞏr. So, too, the results obtained by calculation from the bration of the excursions of the plethysmograph seem to of very doubtful absolute value. It is possible to change excursion so greatly by the slightest movement of the ıysmograph or by the slightest inaccuracy of the adapta-of the rubber to the auriculo-ventricular sinus that any trary uniform calibration would seem to me as valuable e particular factor which is found by calibrating the tam-Although this is so, when the plethysmograph is once the valvular lesion is produced are perfectly trustworthy, and although as absolute figures they may mean nothing, they give a perfectly good indication of the changes which ensue upon the tearing of the valve. In considering these figures allowance should have been made also for the fact that under such abnormal conditions the size of the two ventricles does not vary equally, so that while in the normal heart an increased flow of blood into the heart might mean an equal enlargement of the ventricles, such an effect might be modified in the heart with torn aortic valve, by the fact that an increased regurgitation would cause a disproportionate enlargement of the left ventricle. This would accentuate the modifications of the "residual blood" which are given in the protocols in which no such allowance is made.

Further, it will be seen that the malnutrition of the heart muscle which follows the severer insufficiencies, may be enough to cause the rapid dilatation of the heart and the death of the animal. In such cases the results are quite different from those in which the heart maintains its activities and one of them is given as an illustration (Table IV). Another (Table III) shows a milder degree of the same thing as the curve progresses and shows also the compensation that may take place when the lesion is merely a hole in the valve by the filling of the hole with clot.

The principles outlined in the above discussion are, however, shown to be true in all the curves if allowances be made for the disturbing effects of malnutrition of the heart muscle.

TABLE I.—February 23, 1911. Normal dog. Wt. 10 kg.

Peripheral pressures	70 cm.	150 cm.	150 cm.	150 cm.	70 cm.
Pleth. swing	18.75	24.	27.5	31.	15.
Calibration	.158+2	.079=1	mm.		
Estimate	1.48	1.896	2.172	2.449	1.185
Pulse rate	180	225	240	240	220
No. of beats to give 10 cc	10.3	5.87	5.5	6.5	10.5
One beat gives	.97	1.703	1.818	1.538	.952
Residual blood	0.51	.193	.354	.911	.233
Aortic output per minute	174.6	382.5	436.3	369.12	209.4
Heart work per min. (Pleth. x rate)	266.4	526.6	521.2	587.7	260.7

The table shows the changes in the work done by a normal heart with changes in outflow and inflow pressure.

TABLE IV.—January 3. Dog, weight 8.7 kg. Inflow and outflow at 62 cm. Extreme injury, death from dilation.

	Normal.	Aortic insufficiency.
Pleth. swing	12	15
Calibration	.158=1 mm.	divide by 2=.079
Estimate	.948	1.185
Pulse rate	170	120
No. of beats to give 10 cc	17	22.7
One beat gives	.588	.440
Residual blood	.360	.745
Aortic output per minute.	100.	89.4
Heart's work per min. (pleth. x rate)	161.16	142.2

TABLE II.—December 23. Outflow 57 cm., inflow 75 cm.

	A	B	C	D	E	F	G	H	I
Plethysmographic swing	12.	26.5	31	35	35	33	32		
Calibration	1 mm	= 0.1584 cc.	Each result	is divided b	y 2 for left	ventricle.			
Estimate	.9504	2.0988	2.455	2.772	2.772	2.613	2.534		
Pulse rate	240.	120	90	90	95	95	110	120	120
No. of beats to give 10 cc	23.4	10.6	7	6.65	7.46	7.4	8	15.85	16.4
One beat gives	.427	.943	1.428	1.504	1.340	1.351	1.25	.63	[illegible]
Residual blood	.523	1.155	1.027	1.268	1.432	1.262	1.284		
Aortic output per minute (rate x beat value)	102.48	113.16	128.52	135.36	127.30	128.34	137.50	69.3	[illegible]
Heart work done per minute (pleth. x rate)	228.	251.8	220.9	249.4	263.3	248.2	278.7		

The table shows the effect of the production of aortic insufficiency just before B.

TABLE III.—January 19, 1911. Dog, weight 10.8 kg. Inflow 80 cm., outflow 60 cm.

		Valve cut.						Valve cut again.					
	1	2	4	5	6	7	A	B	D	F	G	H	I
Plethysmographic swing	17	24	29	25	24	24	25	27	29.5	34	39	33	32
Calibration		1 mm.	= .158 cc.	All res	ults divi	ded by 2.							
Estimate	1.343	1.896	2.291	1.975	1.896	1.896	1.975	2.133	2.33	2.686	3.008	2.607	[illegible]
Pulse rate	190	160	175	175	175	175	170	165	165	170	160	190	190
No. of beats to give 10 cc	25	16	12.8	17.3	21.5	21.5	8	8.2	7.9	8.2	8.6		
One beat gives	.4	.625	.78	.578	.464	.464	1.25	1.219	1.265	1.219	1.515	1.33	[illegible]
Residual blood	.943	1.271	1.511	1.397	1.432	1.432	.725	.914	1.065	1.467	1.565	1.277	[illegible]
Aortic output per minute	76.0	100	134.50	101.15	81.2	81.2	212.5	201.13	208.72	207.2	242.4	252.70	
Heart output (pleth. x rate)	255.1	303	400.9	345.6	331.8	331.8	335.7	351.9	384.4	456.6	492.8	495.3	[illegible]

In this experiment the inflow pressure was higher than the outflow and was not changed. Insufficiency was slight in the first curve, the parts of which are numbered. In the second curve the heart had gained in vigor and a further tear of the valve was produced between B and D. Apparently the regurgitation was nowhere very great.

TABLE V.—January 11. Dog, weight 11.8 kg. Pressure 60 cm.

	Normal.	Aortic insufficiency.
Pleth. swing	15	25
Calibration	1 mm. = .079	
Estimate	1.185	1.975
Pulse rate	160	130
No. of beats to give 10 cc	19.8	19.7
One beat gives	0.505	0.507
Residual blood	.680	1.468
Heart's work per min. (pleth. x rate)	189.6	256.75

TABLE VI.—March 14, 1911. Weight 6 kg.

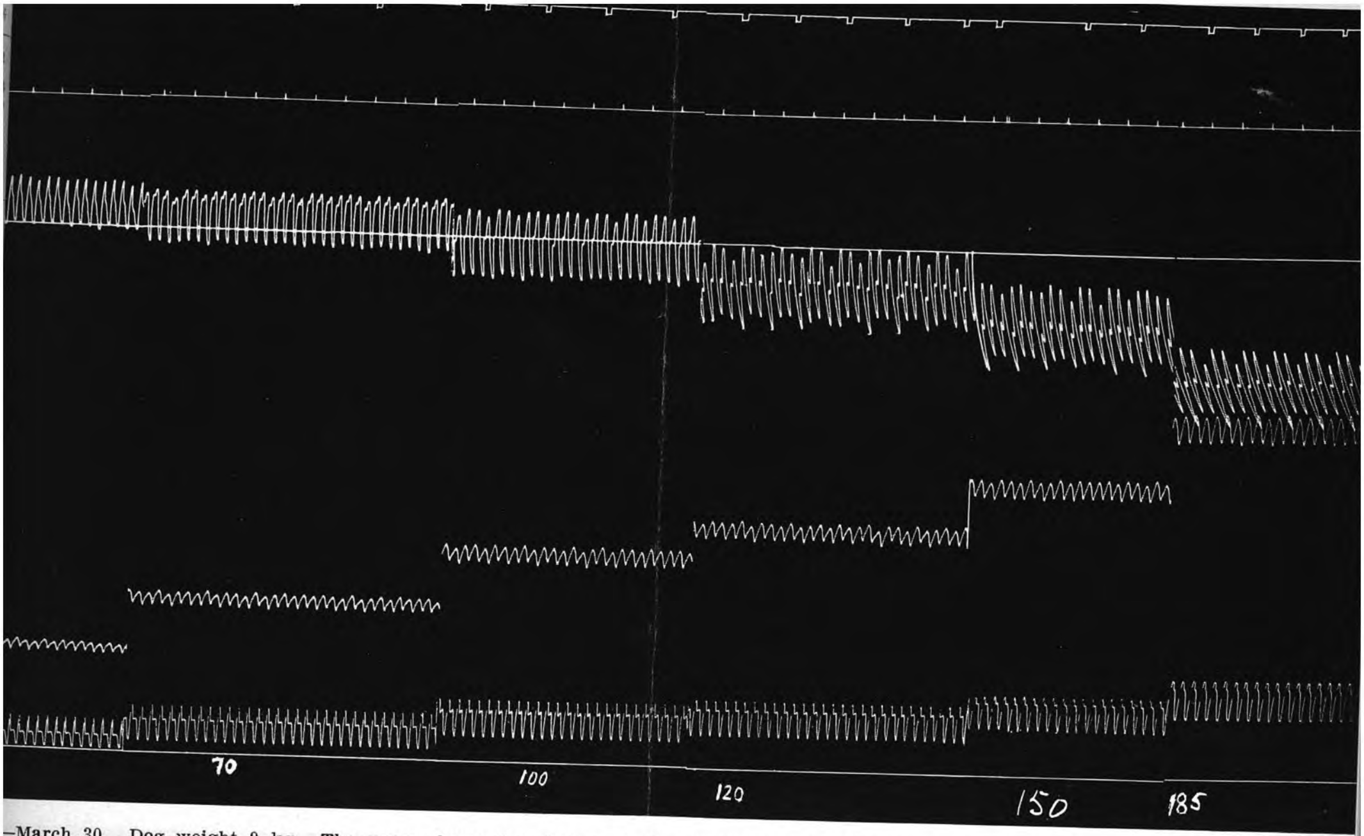
	Normal.		Aortic Insufficiency.				
	A	B	C	D	E	F	G
Periph. pressure	80	120	120	70	40	150	150
Pleth. swing	14.3	18	27.5	16.24	13.26	29.6	37.7
Calibration	1 mm.	=.01584	All re	sults d	ivided	by 2.	
Estimate	1.1297	1.4256	2.178	1.286	1.05	2.344	2.9858
Pulse rate	150	155	160	180	160	160	160
No. of beats to give 10 cc	10	7.6	7	11	16	5.5	5.5
One beat gives	1	1.316	1.4285	0.909	0.625	1.818	1.818
Residual blood	.1297	.1096	.7495	.377	.325	.526	1.1678
Aortic output per min.	150	203	228	163	100	290.8	290.8
Cardiac output per min. (pleth. x rate)	169.4	220.9	348.4	231.48	223	375	477.7

TABLE VII. April 24. Dog, wt. 7.6 kg. Small aperture pierced in valve.

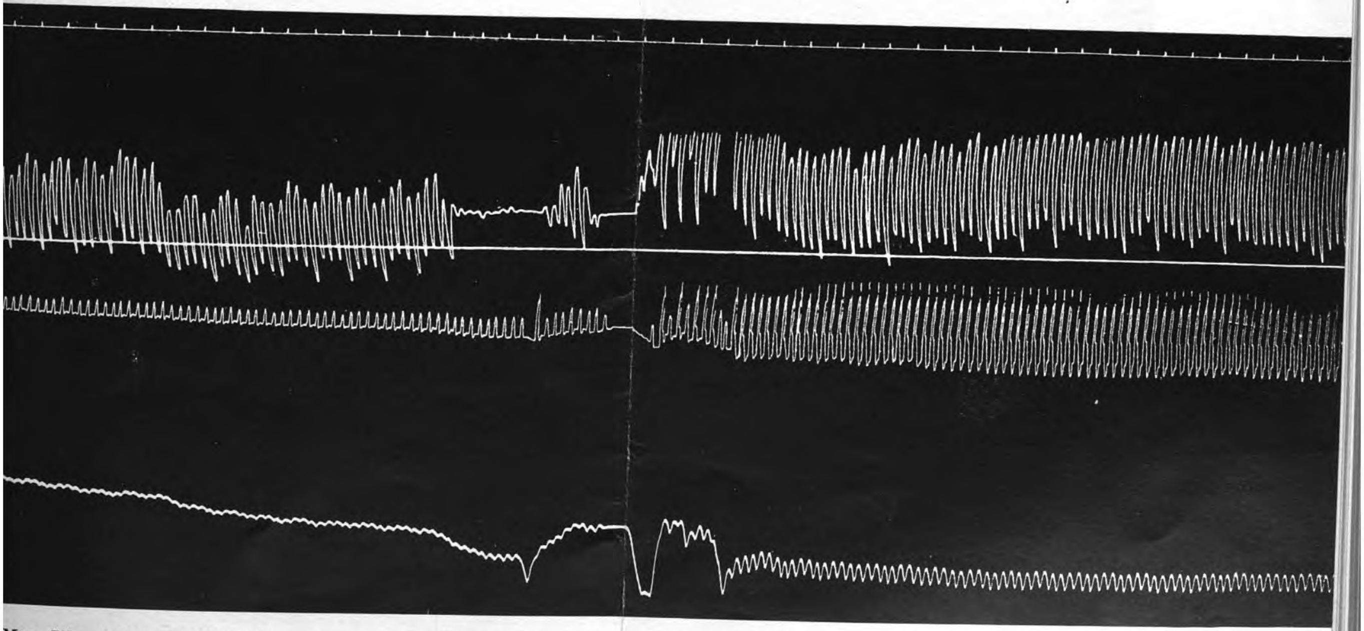
		Valve cut.		
Pressures	100	120	120	100
Pleth. swing	20.1	27	28.16	[illegible]
Calibration		5 cc. =	35 mm.	
Estimate	28.7	38.5	40.2	[illegible]
Pulse rate	200	195	190	195
Number of beats to give 10 cc	7	5.8	5.7	6.5
One beat gives	1.42	1.72	1.75	[illegible]
Residual blood	1.45	2.13	2.27	[illegible]
Aortic output per minute	284	335.4	332.5	[illegible]
Heart output per minute (pleth. x rate)	574	750.7	763.8	[illegible]

TABLE VIII. April 24, 1911. Dog, weight 9.4 kg.

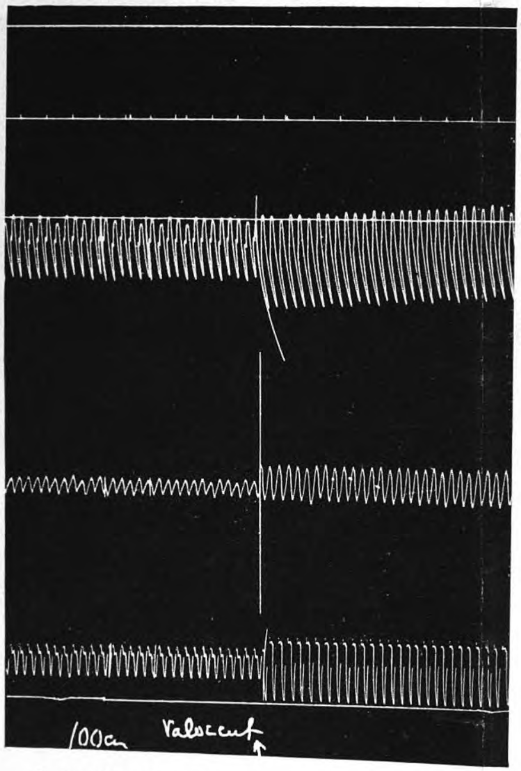
		Aortic valve cut.		
Pressures	100	120	120	100
Pleth. swing	10.3	13.66	20.9 (17.46)	18.2
Calibration		35 mm. =	5 cc.	
Estimate	1.47	1.95	2.98 (2.49)	2.6
Pulse rate	250	250	250	240
Number of beats per 10 cc.	8.26	7.5	7.3 (7.8)	8.57
One beat gives	1.21	1.33	1.37 (1.28)	[illegible]
Residual blood	0.26	0.62	1.61 (1.21)	[illegible]
Aortic output per minute	302.50	332.50	342.50	[illegible]
Heart output per minute. (pleth. x rate)	367	487.5	745	[illegible]



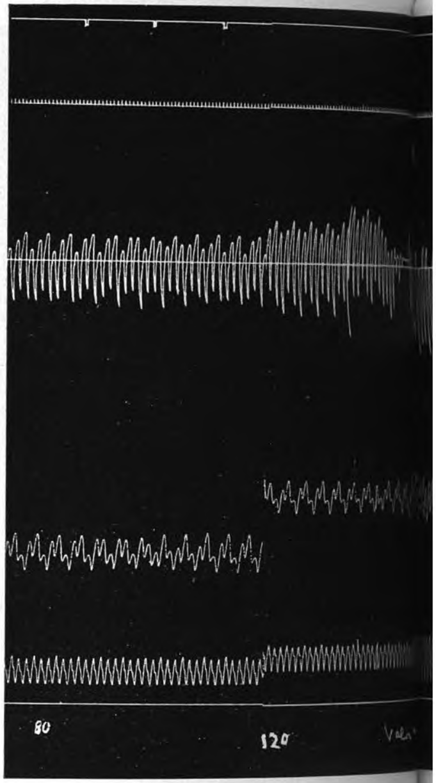
—March 30. Dog weight 9 kg. The curve shows the changes in the position of the dicrotic notch, upon the Hürthle tracing and the
of the heart with increasing inflow of blood. The excursion of the heart is also seen to be greater at the higher pressure.



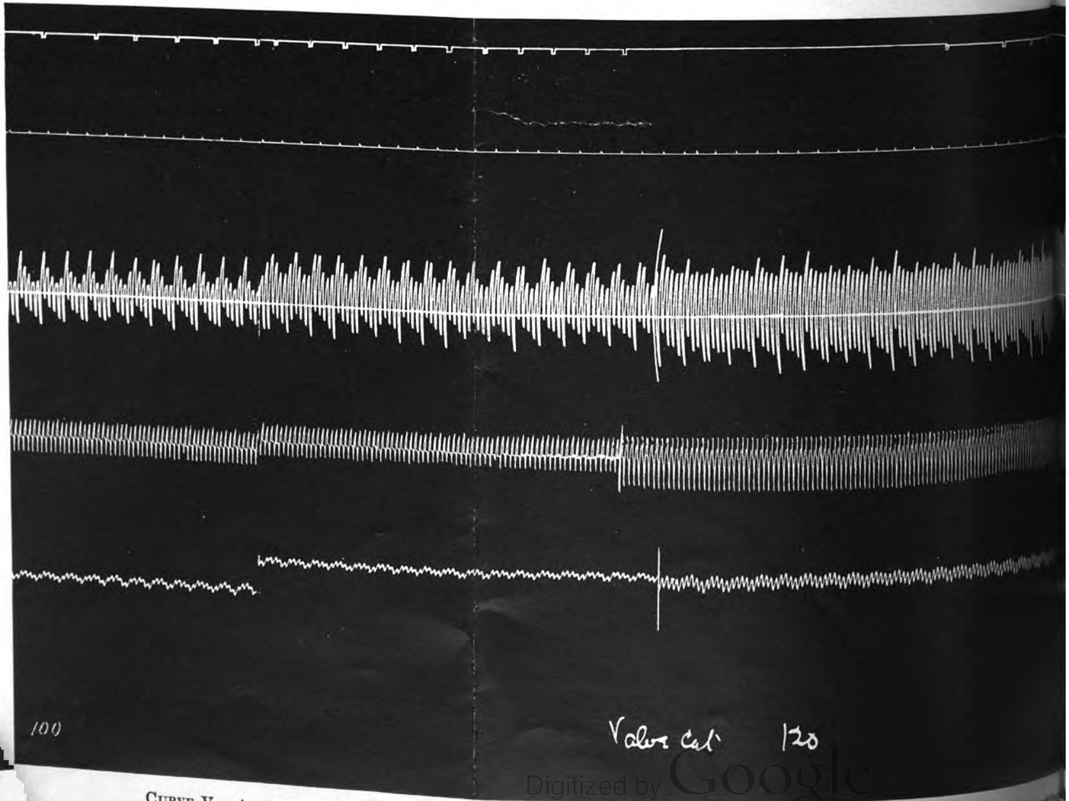
May 7th. Dog weight 7.2 kg. Plethysmographic and other tracings from dog with intact aorta, and after the tearing of the aortic valve.
ographic excursion is increased and the increased pulse pressure is characteristically shown in the curve from the Hürthle manometer.



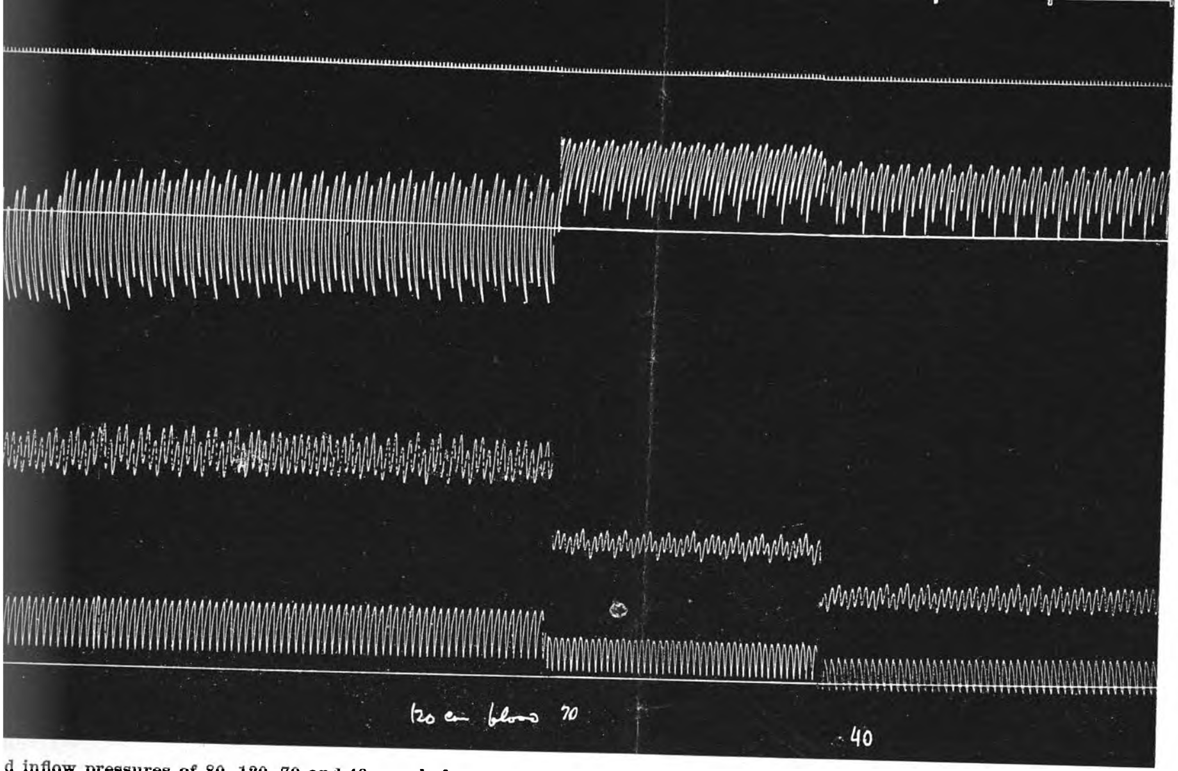
CURVE III.—March 30. Dog weight 9 kg. Characteristic change in all curves on tearing of the aortic valve.



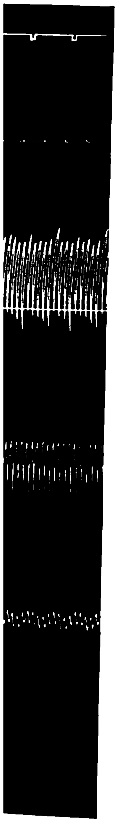
CURVE IV.—Marc

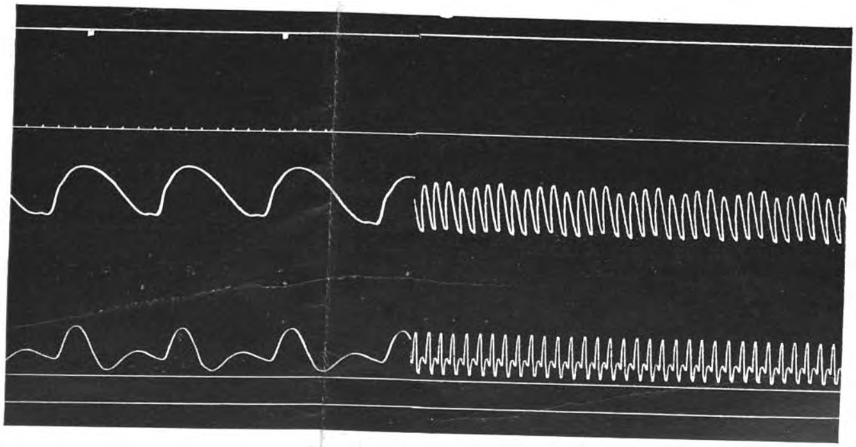


CURVE V.—April 24. Dog weight 9.4 kg. Curves at pressures of 100 and 120 cm. of blood, before and after

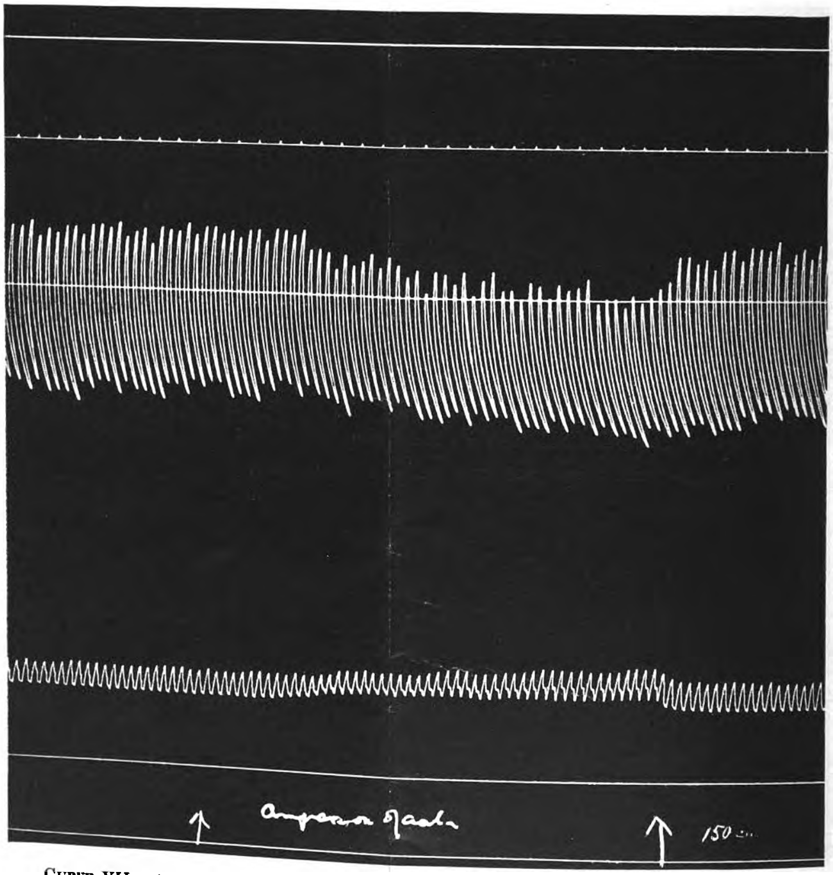


d inflow pressures of 80, 120, 70 and 40 cm., before and after cutting of aortic valve.

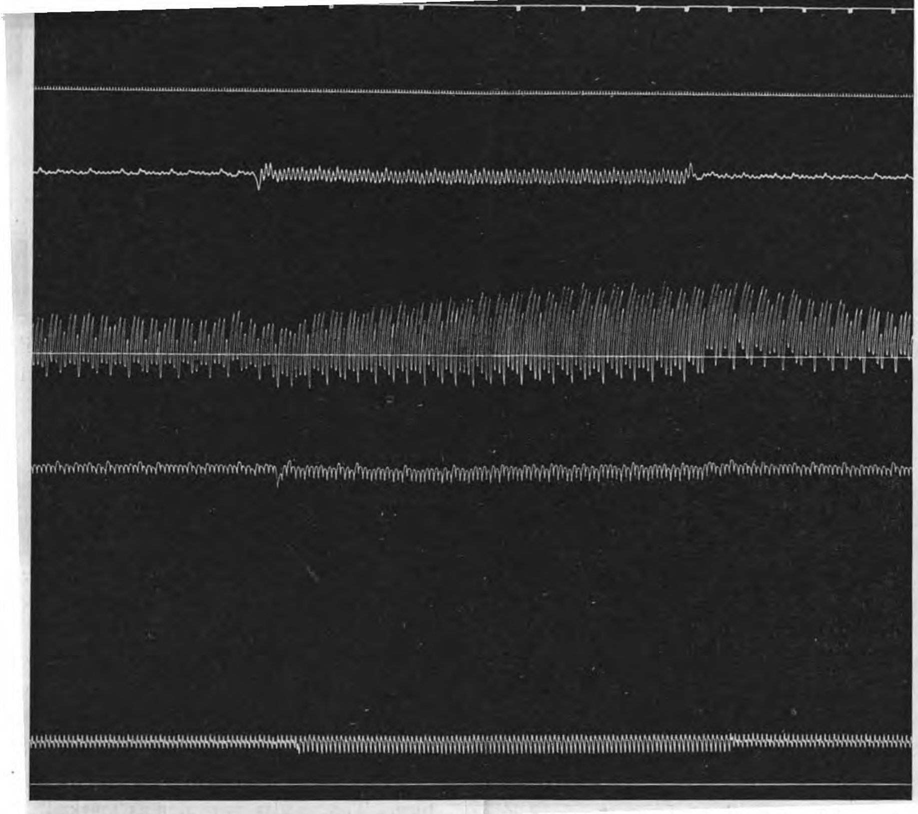




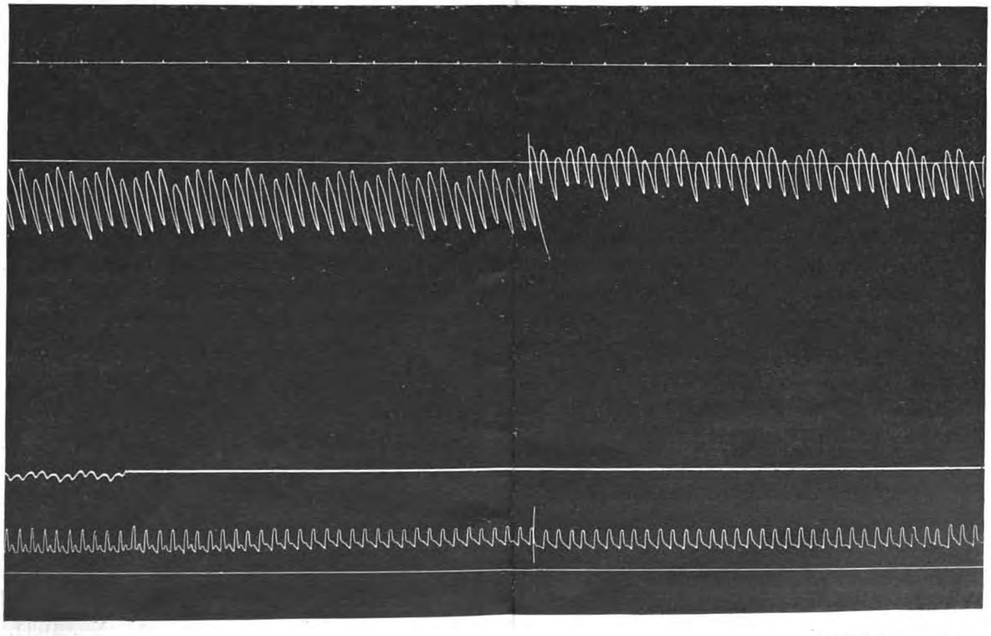
Curve VI.—April 17. Plethysmographic and Hürthle curves in aortic insufficiency in the curve which has become hyperdicrotic. It was in this curve that auscultation showed the part of the curve occupied by the murmur.



CURVE VII.—April 6. Dog weight 6.3 kg. Curve shows the accentuation and elevation on the slope, of the dicrotic notch on compression of the aorta.



CURVE VIII.—February 7. The curve shows the appearance of a collapsing pulse produced by allowing regurgitation from the artificial aorta by tapping it with a "T" tube as described in the text. It is observed that the output is decreased during this regurgitation. Other particulars are mentioned in the text.



CURVE IX.—Shows absence of alteration of character of pulse on introducing artificial arrangement of circulation. It also shows that the fling of the mercury manometer has no influence upon the Hürthle record.

A FURTHER NOTE ON THE CLINICAL USE OF SCARLET RED AND ITS COMPONENT AMIDOAZOTOLUOL, IN STIMULATING THE EPITHELIATION OF GRANULATING SURFACES.*

By JOHN STAIGE DAVIS, M. D.,

Instructor in Surgery, The Johns Hopkins University.

INTRODUCTION.—In a paper published in THE JOHNS HOPKINS HOSPITAL BULLETIN, in June, 1909, I reported the results of my observations during the treatment of 60 cases with scarlet red in various combinations.

Since that time I have been impressed by the great interest in the clinical use of this dyestuff as shown by the large number of papers on this subject which have appeared in the foreign journals, and also by a number of personal communications reporting favorable results.

The object of this article is to bring the subject up to date as far as possible, and in addition to make a few observations on the clinical use of amidoazotoluol, which was first tried by Hayward† and is a component of the scarlet red originally used by Fischer.

I was very skeptical when I began to experiment with scarlet red. It was difficult to believe that by the application of a commercial dyestuff such rapid epithelial stimulation could take place in sluggish wounds, some of which had been unhealed for many years.

It has been suggested that possibly the wounds healed with scarlet red were in a period of development in which, after being inactive for a longer or shorter time, the rapid epithelial growth would have taken place just as well under any other method of dressing. This may be true in a few instances, but I hardly believe it could have been the case in the large number of cases reported, where the process of healing had been at a standstill until this dressing was begun.

Carrel, in his very interesting article on "The Treatment of Wounds" (J. Am. M. Ass., 1910, p. 2148), says that when at the end of the period of "granulous retraction" of a large wound the edges of the old epidermis are still at a distance of 20-25 mm., the new epidermis cannot spread on the granulations and the cicatrization of the wound comes to a standstill.

Now, in practically all of the wounds which I have treated with scarlet red and amidoazotoluol, the period of "granulous retraction" had long since ceased, the period of epidermization had also come to a standstill, and the areas were, for the most part, very large. In spite of these facts, in the large majority of cases there was marked epithelial stimulation from the hitherto sluggish edges following the application of the dyestuff, and subsequent rapid healing.

Scarlet red was used exclusively as a dye until 1900, when Michaelis found that this coloring matter was very suitable for staining fat in the cellular tissue for microscopic examination.

EXPERIMENTAL USE.—B. Fischer in 1906, in a paper on the "Experimental Generation of Atypical Epithelial Proliferation," produced by the subcutaneous injection of a saturated solution of scarlet red, in olive oil, in a rabbit's ear, first called attention to the remarkable stimulating properties of this dyestuff, and suggested that therapeutic advantage might be taken of it. Since his publication a number of investigators (Ritter, Jores, Geipel, Snow, Stahr, Wyss, Helmholz, McConnell, Seckel, Hertzler, Schreiber and Wengler, Werner, Enroth, Stoeber, Grimani, Dixon, Cords, Wessley, Meyer, Borst), following Fischer's lead, have repeated his experiments and extended them. As far as I can ascertain, all, with the exception of Snow, have agreed that a new growth of epithelium is produced.

Several kinds of animals have been used, rabbits, Belgian hares, guinea pigs, white rats, mice, monkeys, dogs, cats, etc. These proliferations have also been produced in man. Wessley experimented on himself, and Stoeber upon a man 80 years old, whose leg was to be amputated for ununited fracture. The results were not as marked as in the rabbit's ear, on account of anatomical conditions, but were definitely positive. Stoeber injected scarlet red, amidoazotoluol and alpha naphthylamin, but did not succeed in producing epithelial proliferation by alpha naphthylamin. It is beyond the scope of this paper to discuss the theories as to the cause and source of these atypical epithelial proliferations.

An interesting point is made by Claribel Cone, who says that in the epidermis of man the fat which is shown by the scarlet red stain is especially noted in the basal (germinal) layer at the point of contact of the cell body and nucleus; in other words that the scarlet red attacks the living cell just at the point where physiological cell changes are most active. She suggests that this may cause a chemical or physical stimulation of the cell, and thus account for the active proliferation following its clinical use.

CHEMISTRY.—In looking over the literature on the clinical and experimental use of scarlet red I find that there are several chemically different dyestuffs which are marketed under the name scarlet red. I will consider the chemical formulæ of four of these.

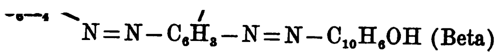
(1) The dye used in my series in 1909 was the sodium salt of diazo-azo-benzene-disulphonic acid Beta naphthol.

Commercial Names.—Biebrich Scarlet; Pouceau 3 RB; Pouceau B; Fast Pouceau B; New Red L; Imperial Scarlet (Schultz & Julius, 1904, p. 110, No. 163).

---

* Read before the Johns Hopkins Hospital Medical Society, April 3, 1911.

† All references are arranged alphabetically under "Bibliography" at end of this article, so that the papers referred to under authors' names are readily to be found.



$N=N-C_6H_3-N=N-C_{10}H_6OH$ (Beta)

Method of Preparation.—Amido-azo-benzene-disulphonic cid and Beta naphthol. It is a red powder, soluble in water nd slightly soluble in alcohol. Insoluble in ether.

(2) Benzene-azo-benzene-azo Beta naphthol.

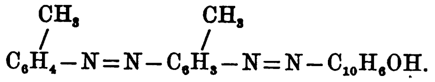
Commercial Names.—Soudan III; Cerasine Red (Schultz ; Julius, 1904, p. 106, No. 143).

$C_6H_5-N=N-C_6H_4-N=N-C_{10}H_6OH$ (Beta)

Method of Preparation.—Amido-azo-benzene and Beta aphthol. It is a brown powder, soluble in alcohol and fats. nsoluble in water.

(3) Toluene-azotoluene-azo Beta naphthol. This is the :arlet red originally used by Fischer and Schmieden.

Commercial Names.—Oil Scarlet; Red B Oil Soluble xtra-concentrated; Pouceau 3 B (Schultz & Julius, 1904, 108, No. 150).

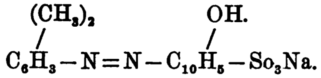


$$\overset{CH_3}{C_6H_4}-N=N-\overset{CH_3}{C_6H_3}-N=N-C_{10}H_6OH.$$

Method of Preparation.—Amido-azo-ortho-toluene and Beta ıphthol. It is a dark reddish-brown powder which cakes about 175° C. and melts at 184° to 186° C. Insoluble in ıter, soluble in alcohol and chloroform, fats, fatty oils, and so warmed vaseline and paraffine.

(4) Sodium salt of xylene-azo Beta naphthol monosulıonic acid.

Commercial Names.—Scarlet G. R; Scarlet R; Brilliant :ange R; Orange L (Schultz & Julius, 1904, p. 86, No. 54).



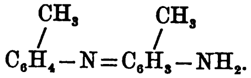
$$\overset{(CH_3)_2}{C_6H_3}-N=N-\overset{OH.}{C_{10}H_5}-So_3Na.$$

Method of Preparation.—Xylidene and Beta naphthol nosulphonic acid. It is a cinnibar red powder, soluble in ter.

[have used clinically the first three of these preparations h success, and also xylidene scarlet (Schultz & Julius, 1904,)6, No. 55) which is closely related to the fourth preparaı. I find the best and most consistent results with scarlet have followed the use of the dyestuff originally employed Fischer and Schmieden. Hayward says that in the few ›s reported where no result was attained this special dye probably not used. He has also experimented with dan I, Soudan IV and Soudan G, with more or less suc-.

[e says that Fischer and Schmieden thought that Alpha hthylamin caused the epithelial stimulation in the most reaching way. Hayward used this substance clinically, found that it caused only marked irritation. This was my experience when I used Beta naphthol ointment of a ıgth corresponding to that actually entering into the ıation of 8 per cent scarlet red, i. e., 2.4 per cent.

ɛperimenting further Hayward employed amidoazotoluol, component of scarlet red, and found that this substance caused a more marked stimulating effect on the growth of epithelium than did the scarlet red.



$$\overset{CH_3}{C_6H_4}-N=\overset{CH_3}{C_6H_3}-NH_2.$$

Method of Preparation.—Slowly add a saturated solution of sodium nitrate (1 mol.) to a mixture of orthotoluidine (4 mols.) and concentrated hyrochloric acid (2 mols.) and keep at a temperature of 30° to 40°. It is a reddish-brown granular powder. Melting point about 100° C. Nearly insoluble in water, but easily soluble in alcohol and ether.

CLINICAL USE.—A few words concerning the papers which have appeared on the clinical use of these substances may be of interest.

Schmieden was the first to follow Fischer's suggestion that scarlet red be used therapeutically, and in February, 1908, published a paper on his clinical results, which were very favorable. He reported rapid healing of sluggish ulcers of various kinds and in different situations. He used 8 per cent ointment and alternated the dressing every 24 hours with some bland ointment on account of the irritating properties of the scarlet red. He also used with success adhesive plaster impregnated with 10 per cent scarlet red for strapping leg ulcers.

He insisted that the granulations must be perfectly clean and flat, and said that it was useless to apply the ointment to an unclean ulcer. He noted that there was little chance of cicatricial contraction under this healing, and showed by microscopic examination that the newly formed skin was the same as the normal skin.

In May, 1908, Kaehler substantiated Schmieden's work and modified his technic. He found good results could also be obtained when scarlet red was used on unhealthy granulating wounds. He healed a varicose ulcer with scarlet red, and then was able to thoroughly clean up this new skin and operate through it for excision of varicose veins, thus showing the stability and quality of the newly formed epithelium. He completely healed defects of similar size, one with grafts and one with scarlet red, in exactly the same time.

Krajca, in September, 1908, described further good results. He was the first to use scarlet red in conjunction with partial Thiersch grafts, and found that the edges of the grafts were stimulated as well as the wound edges. He mentions a number of interesting cases. Some of the ulcers, although of large size, healed in a very short time under this treatment. He found the cutaneous irritation due to the scarlet red to be the exception rather than the rule.

Enderlen, in September, 1908, published very satisfactory results, as did Cernezzi and Hubner, in February, 1909. Wolfrom and Cords in the same month wrote on the successful treatment of ulcers and wounds of the cornea by 5 per cent scarlet red salve. Excellent results were obtained in a case of keratitis neuroparalytica. An old corneal fistula was closed by this means. A more rapid regeneration of the tissues was noted and sometimes an excess of tissue formation, but this soon flattened.

Sprecher, in March, 1909, reported good results in the treatment of ulcerated lupus vulgaris, ulcers of prepuce, vulva, labia and cervix, varicose leg ulcers, syphilitic ulcers, ulcers of the breast, etc. He did not observe any local irritation or toxic effect in his series.

Rebaudi, in April, 1909, described the use of scarlet red in gynecological conditions and obtained excellent results in the treatment of erosions, tears, etc.

Pleth and Pleth, in May, 1909, detailed the successful use of scarlet red on ulcers of various kinds. Heermann, in June, 1909, reported the success of his treatment with scarlet red of tympanic membrane perforations. He said the duration of the perforation seemingly had no effect on the rapidity of the healing. Suppuration did not appear during this treatment.

Ducros, in July, 1909, reported favorable results on granulating wounds, as did Morawetz, in September of the same year. Hayward wrote in the same month concerning the use of an 8 per cent ointment of amidoazotoluol, which is, as I have mentioned before, a component of the scarlet red used by Fischer. His results on a number of granulating wounds were even more favorable than with the scarlet red, and he felt convinced that this was the stimulating portion of the dyestuff.

It does not seem possible that amidoazotoluol is alone responsible for the epithelial stimulation, as a number of observers, myself included, have noted very favorable results produced by the clinical used of dyestuffs which do not contain amidoazotoluol.

Grossmann, in December, 1909, reported favorable results with scarlet red salve, amidoazotoluol ointment and amidoazotoluol gauze, in the treatment of wounds following operations on the nasal passages, and in perforated tympanic membranes. Halle, and also Levy, said that they had been successful in similar cases with the scarlet red.

Hartman and Beyer stated at the same meeting that they had used scarlet red in a small number of cases without any particular success. Sonntag and Brühl said they had failed to get rapid results in similar cases.

Auerbach, in 1909, published a number of successful results in the treatment of ulcers occurring in skin and venereal diseases, varicose ulcers, etc. He was unsuccessful in only one case, a multiple leg ulcer which was complicated by extensive varices. The other leg of this patient had been previously amputated for leg ulcer. He used the treatment with success on wounds which were discharging copious purulent secretions. He had irritation with 8 per cent scarlet red, so tried 4 per cent, which he found could be used continuously. Dauthuile also reported favorable results.

The papers which have appeared in 1910 are as follows: Rammstedt and Jacobsthal mentioned excellent results in the healing of ulcers due to X-ray burns. Dreifuss reported favorable results in the treatment of granulating wounds. Cords said it was of use in the eye only in clean ulcers of the cornea, especially if there was deep loss of substance.

Pein detailed a number of cases successfully treated with scarlet red, and gave a very interesting table of the measurements, taken from 25 leg ulcers, from the beginning of the treatment to the time of healing.

Strauss published his very favorable results in the treatment of X-ray burns and other ulcers of various kinds. He says he does not value the use of scarlet red for the rapidity of epitheliation alone, which, in some cases, does away with the necessity of Thiersch grafting, but for the solid epithelium which is of great value, especially in the region of the joints. By this healing contractions and scar tensions can be avoided. Stein reported good results in otiatrics. Scharezki was very successful in the treatment of skin defects of various kinds.

Katz reported favorable results with 8 per cent scarlet red and amidoazotoluol. Simin had excellent results following the use of scarlet red.

Nance (J. Ophth., Otol. & Laryngol., 1911, p. 41) reported very favorable results with scarlet red in the treatment of corneal defects.

It can be seen from the above that by the use of scarlet red and amidoazotoluol very satisfactory results have been obtained. The tone of nearly all of these papers has been enthusiastic, and the only unfavorable results are those reported by Hartmann and Beyer, Sonntag and Brühl. All of these were in aural cases.

Since the publication of my paper I have continued to use scarlet red on a number of other cases with almost uniform success, and have little to add to the technic described at that time.

I find marked epithelial stimulation even when the wounds are unhealthy and the discharge is profuse. This has also been the experience of Kaehler and Auerbach, although nearly all the other writers, beginning with Schmieden, have stated that it is useless to apply the scarlet red ointment to any but a perfectly clean granulating wound. Of course the most rapid results are obtained on flat healthy granulating surfaces, but a great deal of progress can be made by its use while the granulations are being brought into this condition.

Strauss objects to the use of scarlet red put up in balsam of Peru ointment, blue ointment, iodoform ointment, etc., as recommended by me, in the treatment of unhealthy granulating wounds, on the ground that the ointment is of no use on such ulcers, but my experience has evidently been very different from his. I consider the use of such combinations to be of value in the treatment of unhealthy granulating wounds, as the scarlet red in itself has no antiseptic qualities, and the cleansing process due to the balsam of Peru, etc., can in this way be carried on while the scarlet red is being used, as well as by the alternating dressing.

TECHNIC.—An outline of the technic will suffice. Cleanse the wound thoroughly with boric or salt solution and dry. Peroxide of hydrogen may be used before the boric solution if the granulations are unhealthy. The free use of a nitrate of

Tincture of iodine, U. S. P. strength, may follow the silver nitrate or be used on alternating days, and is a powerful and rapid method of cleansing granulations.

The strength of the scarlet red ointment ordinarily used is 8 per cent, and it should be alternated every 24 to 48 hours with some bland ointment. By applying a weaker ointment, say 4 per cent, it can be used over longer periods without danger of the severe irritation which occasionally occurs.

The most satisfactory method of applying the ointment is as follows: Anoint the skin surrounding the defect with some bland ointment up to about one centimeter of the wound edge, as this prevents possible irritation. Then spread the scarlet red ointment in a thin layer on perforated old linen and apply to the wound, either along the edges or over the whole surface. A light dressing of sterile gauze secured by a bandage completes the procedure.

I have applied the scarlet red ointment to a number of wounds and then exposed them to the air and sunlight. The healing is very rapid and the drying out of the surface is most noticeable.

It is safe to use a 4 per cent scarlet red ointment on partial skin grafts of all kinds 48 hours after grafting, and there is rapid stimulation of the wound edges and also of the grafts themselves.

Case Reports.—I will mention only one case to illustrate the efficacy of scarlet red. A very feeble old lady, 84 years old, was badly burned across the shoulders six weeks before she came under my care. During that time she had been carefully treated by her family physician with the usual methods. The wounds had done well for several weeks, and then had ecome sluggish and no further progress could be made. The atient's general condition was bad on account of a weak heart nd chronic nephritis, and was becoming serious under the train. I was called to consider the advisability of grafting.

There were three ulcers, one over the right scapula, 5 x 10 m., another over the left scapula, 5 x 8 cm., and a third ulcer x 10 cm. situated in the mid-line between the other two. hose over the scapulæ were covered with clean, but edemaus granulations, which had not yet reached the level of the in. The central wound was still covered, to a large extent, a slough which was made up of the whole thickness of the in and some subcutaneous tissue. The epithelial edges of ese ulcers were very sluggish.

On account of the condition of the patient and the situation the wounds, I decided to try scarlet red instead of grafting.

November 26-27, 1910. The wounds were dressed with a lsam of Peru and castor oil mixture, 1 to 3.

November 28. Scarlet red, 8 per cent, was applied, and ereafter every third day, alternating with boric ointment.

December 7. The last of the slough was removed.

December 16. The wound over the left scapula was healed.

December 23. The central wound was healed.

December 25. The wound over the right scapula was led.

During the treatment the patient was in a critical condition almost continuously and had to be strongly stimulated in order to preserve her life.

The case is instructive from the fact that old age and great debility seem to have little deterrent effect on the stimulating power of scarlet red. The skin edges were stimulated in spite of the presence of a slough in the central wound. It was only necessary to use the scarlet red ointment in nine dressings to complete the healing. The result was a firm, thick and stable skin, which showed no tendency to contract.

After the appearance of Hayward's paper on the efficacy of amidoazotoluol, I had the opportunity of using this substance on a number of granulating wounds of varying etiology. The results have been excellent.

Calculating the amount of amidoazotoluol in scarlet red from the molecular weights, we find that there is 3.76 per cent of amidoazotoluol in an 8 per cent scarlet red ointment. I have used this strength as well as 8 per cent in simple vaseline, and also in the balsam of Peru and other ointments suggested earlier in the paper. I will illustrate the efficacy of amidoazotoluol by briefly reporting two cases.

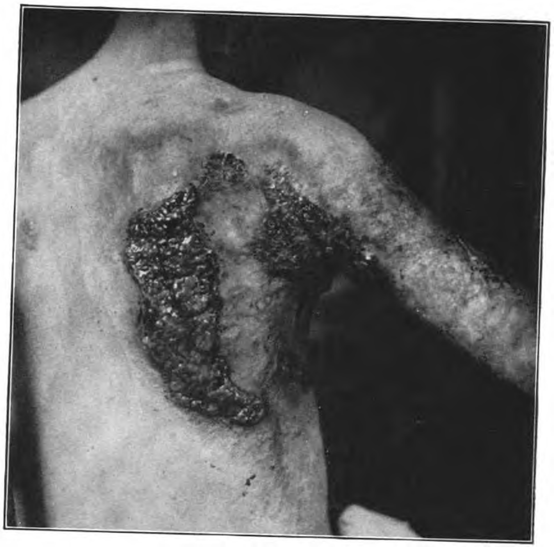


Fig. 1a.

Case I.—A boy, 14 years old, fell into the fire while in an epileptic attack and was severely burned. He was admitted to the hospital and was much improved, during his five months' stay, by grafting and various other methods. He was then sent to the Out-Patient Department for dressing, and as no further progress was made in the healing he was referred to me eight months after the accident.

The size of the unhealed areas at this time can be well made out in the illustrations. The wounds were covered with very exuberant granulations which secreted actively. The epithelial edges were at a standstill. The patient refused to be grafted and it was decided to try eight per cent amidoazotoluol ointment. The granulations were trimmed off with scissors, then cauterized with silver nitrate, and this was followed by tincture of iodin. This procedure was carried out whenever necessary throughout the treatment.

February 24, 1910 (Fig. 1, a and b). All of the ulcers were dressed with amidoazotoluol ointment and this was alternated every 24 to 48 hours with balsam of Peru and oil, zinc oxide or boric ointment. A stimulation of the epithelial edges was noticeable within 48 hours.

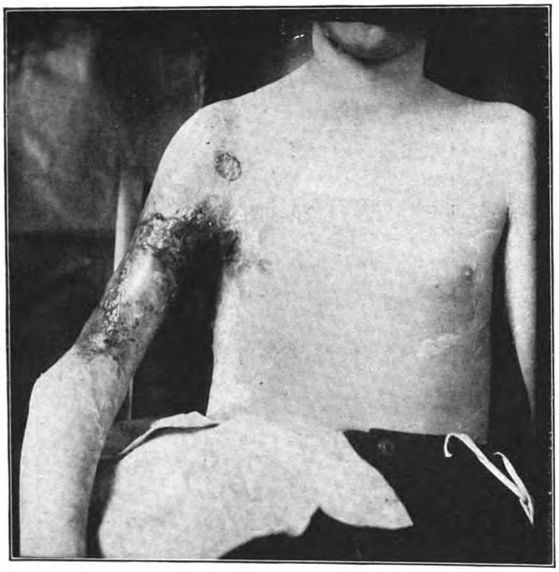


FIG. 1B.

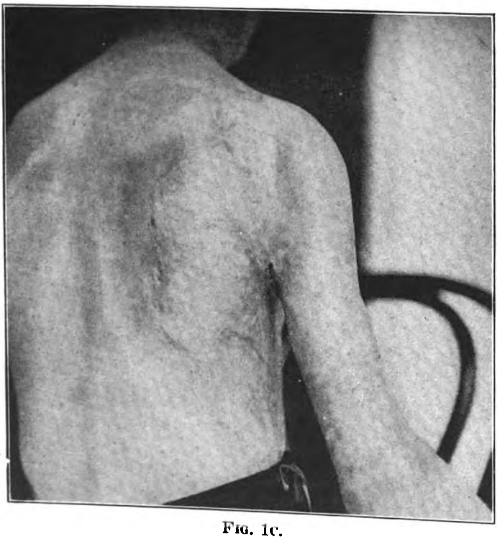


FIG. 1C.

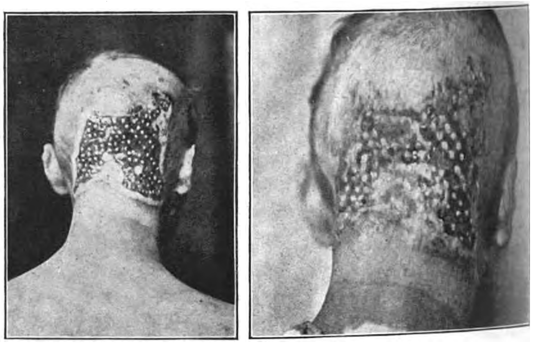
FIG. 1.—CASE I. Sluggish ulcers following burn. Healed with amidoazotoluol. a, b, taken February 24, 1910, eight months after the accident. The ulcers are surrounded by scar tissue. There is partial web formation in the axilla. The exuberant granulations and sluggish wound edges can be well seen. c, taken May 9, 1910. Shows the character of the healing. There is no tendency to contraction. The web formation is less marked.

After the first dressing of the large areas with amidoazotoluol a temporary change of color was noticed in the urine. The patient was dressed at 5 p. m. and the urine voided was as follows: February 24, 6.40 p. m. watery, 500 cc., 9.30 p. m. light lemon, 450 cc.; February 25, 4.30 a. m. *amber*, 430 cc., 7.50 a. m. *reddish brown*, 240 cc., 11 a. m. *reddish brown, slightly darker*, 80 cc., 2.30 p. m. watery, 280 cc., 5.55 p. m. watery, 200 cc., 7.00 p. m. watery, 360 cc. Otherwise the urine was negative. The subsequent dressings did not cause a change in the color of the urine.

May 9. The patient was discharged entirely healed (Fig. 1, c). The healing was firm, thick, and looked like normal skin. Examination of this patient 6 months later showed a firm, movable skin with normal sensation and no tendency to contraction.

CASE II.—A man, 30 years old, was severly burned by an explosion of oil. He came under my care on May 5, six months after the accident, and one of the unhealed areas is well shown in the figure. This wound had improved for a time and then had become sluggish and apparently no further progress could be made from the epithelial edges. Several unsuccessful graftings had been previously done.

The wound was covered with edematous exuberant granulations which were exquisitely tender. An effort was made to put the granulations in a healthy conditon as soon as possible. Toward the end of this process four per cent amidoazotoluol ointment was used as a dressing and was followed by marked stimulation of the edges.



A. B.

FIG. 2.—CASE II. Sluggish ulcer following burn. Healed with small deep grafts and amidoazotoluol. a, taken May 30, 1910, six months after the accident. The ulcer is surrounded by scar tissue. The small deep grafts applied May 28 have all taken and the wound edges have begun to spread. b, taken June 4, 1910. Shows the very rapid epithelial stimulation from the grafts and wound edges after two dressings with amidoazotoluol. The entire wound is healed with the exception of a few small areas, whose aggregate size is not larger than a ten cent piece.

On account of the tenderness it was decided to graft. The patient refused to allow Thiersch or whole thickness grafts to be cut.

May 28. The granulations being in good condition a number of small deep grafts were taken from the thigh under local anesthesia, and transplanted on the undisturbed granulations. The grafts were dressed with narrow overlapping strips of protective over which was placed a dry dressing.

May 30. The dressing was changed, and all the grafts were found to have taken (Fig. 2, a).

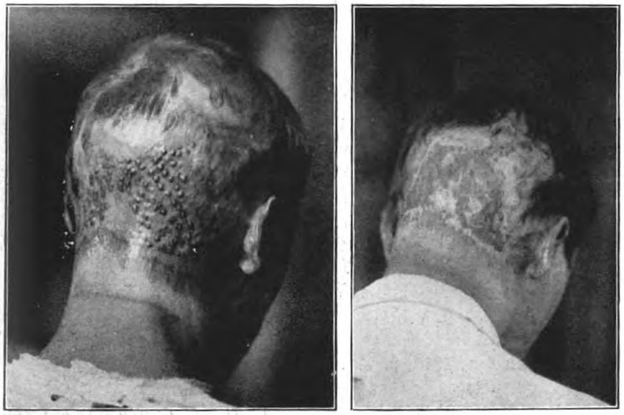
June 1. The grafts were dressed with four per cent amidoazotoluol on old linen. When the dressing was removed 48 hours later it was noted that the grafts were markedly stimulated. Dressed with boric ointment.

June 4. The entire wound, with the exception of one or two small areas was covered with epithelium (Fig. 2, b).

dressing. Four applications of amidoazotoluol had been made. The grafts themselves had become much thickened and projected above the surrounding skin like little warts (Fig. 3, a). This condition disappeared and the entire area assumed the normal level (Fig. 3, b).

Examination of this patient eight months later showed a firm, movable skin with normal sensation. There was still some pigmentation around the grafts, but this was less marked than at date of discharge.

COMMENTS.—I was able to compare the rapidity of healing caused by scarlet red and amidoazotoluol. Following an extensive burn there were two granulating wounds of about the same size. One was dressed with 8 per cent scarlet red ointment and the other with 8 per cent amidoazotoluol ointment. The healing in both was rapid, but the wound dressed with amidoazotoluol healed first. The character of the healing was practically the same.



A. B.

FIG. 3.—CASE II. a, taken June 24, 1910. Shows the remarkable thickening of the grafts, which project like little warts above the skin level. b, taken August 9, 1910. The grafts have assumed the level of the surrounding skin. Considerable pigmentation can be seen in the healed area surrounding the grafts.

The age of the patient seems to have little effect on the stimulating power of these ointments. The general health of the patient is most important and in some instances forced feeding, fresh air and tonics must be resorted to.

It is interesting that a number of patients with exquisitely painful ulcers have remarked that there is less discomfort after dressing with these substances that after any other dressing, however bland.

In none of the cases have I noted the slightest irritation of the surrounding skin following the use of amidoazotoluol. Although this dressing can be used continuously without irritation, it is best to apply it for 48 hours and then alternate with some bland ointment for 24 hours.

Dressing with both substances causes excess of secretion for one or two applications, but there is marked drying up of the granulations in a short time.

The use of scarlet red and amidoazotoluol in blue ointment is advantageous in the treatment of syphilitic ulcers, and in

In the treatment of second degree burns the ointment can be used immediately after the blisters have been cut away. In third degree burns it is best to wait until the granulations have started.

For a time after healing the newly formed skin has a tendency to be dry and somewhat scaly, but this is easily overcome by the applicaton of olive oil or vaseline.

I have not yet seen a wound break down which was healed by the use of scarlet red or amidoazotoluol, although some of the cases have been under observation for over two years.

A grayish membrane is often seen on the granulations after the application of scarlet red ointment. I have not observed this formation following the use of amidoazotoluol.

Thiersch and Reverdin grafts are sometimes tremendously thickened following early dressings with these substances, but this thickening disappears within a few weeks.

At times it is advantageous to apply either ointment directly to the wound and then expose to the sunlight and air.

Scarlet red and amidoazotoluol gauze is prepared by saturating gauze with a 4 per cent or 8 per cent alcoholic solution of the substances and then allowing it to dry.

The substances can be used as a dusting powder by the addition of 4 per cent to 8 per cent strength, to boric powder. I have also tried the full strength powder on a few wounds without irritation. The effect of the scarlet red and amidoazotoluol used in this way is very rapid drying up of the wound and the formation of a tough scab under which the healing takes place.

A simple and satisfactory method of preparing scarlet red and amidoazotoluol ointment is to rub up the substance with a small amount of almond oil until the mass is smooth, and then mix this mass thoroughly with the base.

Both these ointments can be sterilized without interfering with their stimulating properties.

As a rule there is no toxic effect either from scarlet red or amidoazotoluol. Gurbski reports the only case in which any general toxic effect was noted, as follows:

A child, 11 years old, was severely burned by an explosion of turpentine. The lower two-thirds of the thigh and the entire leg to the ankle were involved. After the granulations had formed Gurbski applied 8 per cent amidoazotoluol ointment. Fifteen hours after the application the patient, who had previously been in very good health, began to complain of headache and dizziness. This was followed by violent vomiting and gastralgia. The pulse rose to 110 and was of low tension. The temperature rose to 102.3° F. There was cyanosis of the lips and albumin in the urine.

The dressing was removed and the patient placed on a milk diet. In a few hours all of these phenomena disappeared. Eight days later amidoazotoluol ointment was again applied and the same symptoms reappeared with the exception of the albuminuria. A third dressing, five days later, caused the same symptoms except that the vomiting was less marked.

During the rest of the treatment he applied the ointment to only one-fourth of the wound at a time, and the toxic symptoms did not again occur. Rapid healing followed.

Gurbski thinks the poisoning was due to the amido group in the amidoazotoluol.

I have dressed very large granulating areas for some time with these substances without any deleterious effect.

In this connection an observation by Stoeber is of interest. He says that it is not uncommon to have bladder disturbances among the men who work in the manufacturing of dyes. This trouble is principally among the workmen occupied in the manufacture of amido combinations of benzol and naphthalin, or in factories where these products are used. The disease is characterized by cyanosis,, vertigo and weakness, strangury and bloody urine. In addition to the above symptoms, in long continued handling of these dyestuffs, hemorrhages and tumor formations in the bladder are observed. None of these symptoms have been noted following the clinical use of scarlet red or amidoazotoluol, except as noted above.

The consensus of opinion is that there is no danger of producing malignant growths by the clinical use of these substances. My own experience has convinced me of this, and although occasionally there is an overgrowth of epithelium, this soon assumes the level and the appearance of the normal skin.

Some authors have gone so far as to state that by the use of scarlet red and amidoazotoluol the majority of skin grafting can be eliminated. This is too broad a statement, but there is no doubt that wounds can be healed by these compounds which could not otherwise be satisfactorily closed except by grafting.

Scarlet red and amidoazotoluol will not heal every wound, but in the majority of cases, when applied with the proper technic, they will cause epithelial stimulation in the edges of the most sluggish wounds, and give a rapid healing which is stable and resistant, and which has the macroscopic and microscopic appearance of the normal skin. There is no tendency to subsequent contraction, and the skin becomes movable on the underlying tissues in a reasonable time. Any one of these characteristics would make the use of these substances well worth trying.

BIBLIOGRAPHY.

1. Auerbach: Ueber den therapeutischen Wert der Scharlachsalbe bei Haut und Geschlechtskrankheiten. Klin. therap. Wchnschr., 1909, p. 594.

2. Beyer: Discussion of Grossmann's paper. Deutsche med. Wchnschr., 1910, p. 777.

3. Borst: Atypische Epithelwucherungen. Deutsche med. Wchnschr., 1910, p. 1586.

4. Bruhl: Discussion of Grossmann's paper. Deutsche med. Wchnschr., 1910, p. 777.

5. Cernezzi: Dell' influenza eccitatrice svolta dallo scarlatto R (Michaelis), sulla rigenerazione dell' epitelio cutaneo. Gazz. d. osp., 1909, p. 145.

6. Cone: Zur Kenntnis der Zellveränderungen in der normalen und pathologischen Epidermis der Menschen. Frankfurt Ztschr. f. Pathologie, Festschr. . . . J. C. Senckenberg, Wiesb., 1907, p. 37.

7. Cords: Experimentelle und klinische Erfahrungen über die Wirkungsweise des Scharlachrot bei Hornhauterkrankungen. Klin. Monatsbl. f. Augenh., 1910, p. 1.

8. Dauthuile: Epidermisation rapide d'une vaste escarre gangreneuse de la face antero-externe de la cuisse gauche, par des applications de scharlachrot: Action remarquable de cette substance colorante sur les plaies atones. Nord méd., Lille, 1909, p. 169.

9. Dixon: Proliferations of the Epithelium Induced by Soudan III, Scharlach Roth, and Paraffin: and the Effects of Roentgen Irradiation on the Same. J. Infec. Dis., 1909, p. 205.

10. Dreifuss: Behandlung granulierender Wundflächen mit 8 per cent Scharlachrotsalbe. Deutsche med. Wchnschr., 1910, p. 52.

11. Ducros: Ueber die Behandlung granulierender Wunden mit Scharlachrot. Deutsche med. Wchnschr., 1909, p. 1294.

12. Enderlen: Empfehlung der Scharlachrotsalbe zur Beschleunigung der Epitheliserung granulierender Flächen. Würzburger Aerzteabend, February 20, 1908. München. med. Wchnschr., 1908, p. 2066.

13. Enroth: Epithelisation of Granular Tumors by Scarlet Red Finska läk.-sällsk. handl., Helsingfors, 1909, II, p. 217.

14. Fischer: Die experimentelle Erzeugung atypischer Epithelwucherungen und die Entstehung bösartiger Geschwülste. München. med. Wchnschr., 1906, p. 2041.

15. Geipel: Artefiziell erzeugten Geschwülsten. München. med. Wchnschr., 1907, p. 1057.

16. Gottheil: Scarlet Red. Progress Med., 1910, p. 131.

17. Grimani: Studio sperimentale sulle proliferazioni dell epitelio cutaneo. Riv. Veneta di sci. med., 1909, p. 289.

18. Grossmann: Erfahrungen über die Anwendung der Scharlach-R-Salbe (Schmieden), Scharlachsalbe (Hayward), und der Amidoazotoluolgaze (Epidermolgaze), in der Ohrenheilkunde. Deutsche med. Wchnschr., 1910, p. 777.

19. Gurbski: Betirag zur giftigen Wirkung der Scharlachsalbe. Zentralbl f. Chir., 1910, p. 1550.

20. Halle: Discussion of Grossmann's paper. Deutsche med. Wchnschr., 1910, p. 777.

21. Hartmann: Discussion of Grossmann's paper. Deutsche med. Wchnschr., 1910, p. 777.

22. Hayward: Weitere klinische Erfahrungen über die Anwendung der Scharlachfarbstoffe und Komponenten zur beschleunigten Epithelialisierung granulierender Flächen. München. med. Wchnschr., 1909, p. 1836.

23. Helmholz: Experimental Epithelial Proliferations of Skin and Mucous Membranes. Johns Hopkins Hosp. Bull., 1907, p. 365.

24. Hertzler: The Etiology of Epithelioma; A Laboratory and Clinical Study. J. Am. M. Ass., 1908, p. 425; 1910, p. 2290.

25. Heermann: Scharlachrot bei Trommelfellperforationen. Deutsche med. Wchnschr., 1909, p. 977.

26. Hübner: Demonstration of a patient. Aerztlicher Verein zu Marburg, December 16, 1908. München. med. Wchnschr., 1909, p. 424.

27. Jores: Ueber Art und Zustandekommen der von B. Fischer mittels Scharlachöl erzeugten Epithelwucherungen. München. med. Wchnschr., 1907, p. 879.

28. Kaehler: Epithelisierung von Wundflächen unter Scharlachsalbe (Nach Fischer-Schmieden). Med. Klin., 1908, p. 836.

29. Katz: Ueber die Behandlung granulierender Wunden mit Amidoazotoluolsalbe. Deutsche med. Wchnschr., 1910, p. 1665.

30. Krajca: Zur Epithelisierung granulierender Flächen durch Scharlachrotsalbe. München. med. Wchnschr., 1908, p. 1962.

31. Levy: Discussion of Grossmann's paper. Deutsche med. Wchnschr., 1910, p. 777.

32. McConell: The Experimental Production of Epithelial Proliferation. J. Am. M. Ass., 1907, p. 1498.

33. Meyer: Experimentelle Epithelwucherungen. Ziegler's Beit. z. path. Anat. u. allg. Path., B. 46, H. 3, 1909. München. med. Wchnschr., 1910, p. 538.

34. Michaelis: Quoted by Reinhardt. Biebricher Scharlach R. Apotheker-Zeitung, 1909, p. 90.

Scharlachrotsalbe. Therap. Monats., 1909, p. 479.

36. Nietzki: Chemie der organischen Farbstoffe, 1901.

37. Pein: Ueber die Behandlung des " ulcus cruris " mit Scharlachrot. Die Therapie der Gegenwart, 1910, p. 121.

38. Pleth and Pleth: The Use of Fluorescent Salts (Eosin, Scarlet Red; etc.), in the Practice of Surgery. Am. J. Surg., 1909, p. 162.

39. Rammstedt und Jacobsthal: Ueber Schädigung der Haut durch Roentgenstrahlen. Fortschr. auf d. Gebiete d. Roentgenstrahlen, 1909-1910, p. 14.

40. Rebaudi: Intorno alle utili applicazioni therapeutiche dello Scharlachrot. Ginecologia moderna, 1909, p. 217.

41. Reinhardt: Biebricher Scharlach R. Apotheker-Zeitung, 1909, p. 90.

42. Ritter: Atypische Epithelwucherungen die durch Injection von Scharlachöl am. Kaninchenohr hervorgerufen sind. München. med. Wchnschr., 1907, p. 542.

43. Scharezki: Zur Frage von der Bedeckung von Hautdefkten (Russki Vrach, Nr. 21, 1910). Zentralbl. f. Chir. 1910, p. 1061.

44. Schmieden: Epithelwachstum unter Einwirkung von Scharlach R. Zentralbl. f. Chir., 1908, p. 153.

45. Schreiber und Wengler: Ueber Wirkungen des Scharlachöls auf die Netzhaut. Mitosenbildung der Ganglienzellen. München. med. Wchnschr., 1908, p. 1854. Also Arch. f. Ophth., 1910, p. 1.

46. Schultz and Julius: A Systematic Survey of the Organic Coloring Matters, 1904.

47. Seckel: Ueber experimentell-erzeugte atypische Epithelwucherungen. München. med. Wchnschr., 1908, p. 199.

48. Simin: Das Scharlachrot als ein Epithelisation verstarkendes Mittel. Zentralbl. f. Chir., 1910, p. 1641.

49. Snow: An Attempt to Produce an Atypical Epithelial 1907, p. 385.

50. Sonntag: Discussion of Grossmann's paper. Deutsche med. Wchnschr., 1910, p. 777.

51. Sprecher: Sul valore terapeutico del scharlachrot. Gazz. d. osp. e d. clin., XXX, No. 28, 1909, p. 289. *Also* Klin. therap. Wchnschr., 1909, p. 325.

52. Stahr: Atypische Epithelwucherungen und Karzinom. München. med. Wchnschr., 1907, p. 178.

53. Stein: Ueber die Verwendbarkeit der Scharlachrotsalbe bei Ohrenerkrankungen. Monatsschr. f. Ohrenh. u. Laryng.-Rhinol., 1910, p. 214.

54. Stoeber: Experimentelle Untersuchungen über die Erzeugung atypischer Epithelwucherungen. München. med. Wchnschr., 1909, p. 129.

54. Stoeber: Die Erzeugung atypischer Epithelwucherungen durch Injektion von Scharlachrot und Amidoazotoluolöl in das subkutane Gewebe des Menschen. München. med. Wchnschr., 1910, p. 739.

55. Strauss: Beitrag zur Kenntnis der Wirkung des Scharlach R. auf das Epithelwachstum. Deutsche med. Wchnschr., 1910, p. 895.

55. Strauss: Pansements des plaies avec la solution de la pommade Rouge R. Arch gén. de chir., 1910, p. 810.

56. Werner: Ueber den Einfluss des Scharlachrotes auf Mäusentumoren. München. med. Wchnschr., 1908, p. 2267.

57. Wessley: Ueber die Wirkung des Scharlachrotöls auf die menschliche Epidermis (Selbstversuch). Med. Klin., 1910, p. 542.

58. Wolfrum und Cords: Ueber die Anwendung von Scharlachrot bei Augenaffektionen. München. med. Wchnschr., 1909, p. 242.

59. Wyss: Zur Wirkungsweise der Scharlachöl Injectionen (B. Fischers) bei der Erzeugung karzinomähnlicher Epithelwucherungen. München. med. Wchnschr., 1907, p. 1576.

ON CERTAIN LIMITATIONS IN INTERPRETING THYROID HISTOLOGY

By David Marine, M. D., and C. H. Lenhart, M. D.

Cleveland, Ohio.

(*From the H. K. Cushing Laboratory of Experimental Medicine, Western Reserve University.*)

Any discussion of the limits of histological variation within which a thyroid gland—whether mammalian, avian, reptilian, amphibian or piscine—may be considered normal is largely of academic interest.

It has long been recognized and frequently emphasized by us that the thyroid tissue is extremely labile—reacting quickly to relatively slight physiological variations in the body metabolism and for this reason may show even daily histological changes within narrow limits. The knowledge of this fact, as applying to the thyroid just as truly as to the blood tissue, has made it unnecessary to write long papers to attempt to define in fixed and exact language the strictly normal thyroid or blood tissues. The thyroid tissue being exceedingly active and well endowed with the power to undergo hypertrophy and hyperplasia, one may observe in any animal group insensible gradations in epithelial hypertrophy and hyperplasia from the smallest amount of thyroid tissue compatible with normal body function (the normal) up to marked degrees of thyroid overgrowth. With such gradations in hypertrophy and hyperplasia it is clear that a histological standard of normal must be, within narrow limits, somewhat arbitrary and this fact explains why different observers have adopted somewhat different standards. It has long been evident that a standard of normal could not be ascertained purely by the histological examination of glands taken at random. In the case of mammals the best way to obtain an accurate conception of the least amount of thyroid tissue compatible with normal body function (the normal) is to give minute doses of iodin to a pregnant bitch throughout the pregnancy and after birth to continue the same with the pups up to the sixth month of extra-uterine life; then examine their thyroids histologically, estimate the iodin contents and the relation of the thyroid weight to the body weight. Even then one may not find all the thyroid follicles containing colloid of uniform staining reactions or the lining epithelium of uniform shape and size. One will find that the variations are slight, considering that the measuring rod is unusually delicate as compared with that of most body tissues.

From our six years' experience with the anatomy, the physiology and the chemistry of the thyroid tissue in all the classes of animals and their orders from the cyclostomes to man we have adopted the low cuboidal epithelial cell as most nearly conforming with the normal type of thyroid epithelium although this type of gland cell may be depressed to a still lower degree of physiological activity following prolonged iodin administration or in senile states.

The above remarks while drawn particularly from work on the mammalian thyroid have been found to apply as well to the piscine thyroid. Zoological literature contains many excellent descriptions of the histology of the fish thyroid and in them one notes the same variations in anatomical structure that have so long been known for the mammalian thyroid. Our experience with the thyroid of Teleosts (bony fish) comprises a rather extensive acquaintance with 93 species and we have also noticed great differences in the histological appearance of the thyroid epithelium even in fish living wild in the streams, lakes and oceans. It has been ascertained by experiment that the thyroid changes do not take place so rapidly in the fish as in mammals, but the range of histological variation is just as great and the still more recent studies in comparative pathology of the thyroid gland have shown that in artificially reared carnivorous fish (the trout and salmon particularly) the thyroid is capable of relatively as great overgrowth as in any other order of vertebrates. This excessive overgrowth which has thus far been observed only in artificially reared fish has of late created much interest on account of the expressed views of several observers, that it is carcinoma. This conclusion is based on the fact that the thyroid overgrowth presents the histological appearance of invasion of the surrounding structures (bone, muscle, cartilage, etc.). In some recent publications[1] we pointed out that, owing to the absence of any capsule and the normally wide distribution of the thyroid follicles in fish, invasion did not have the same significance as it would have in circumscribed and encapsulated tissues and in tissues less well endowed with the power of hypertrophy and hyperplasia, and that in view of these facts other criteria than histological appearances must be provided before a frank diagnosis of cancer could be made.

In a paper by Gudernatsch[2] he rather infers that we claim the priority for pointing out the fact that the thyroid gland in fishes was not encapsulated. This was not our intention as excellent accounts of the fish thyroid in a great many species are to be found in literature[3] dating back as far as 1844, and for that reason we wished only to emphasize the fact that in a non-encapsulated tissue like the fish thyroid any overgrowth might give the histological appearance of cancer without actually being cancer. Experimental work with this overgrowth has amply justified that assumption.

In this connection we wish also to correct a misquotation that appeared in the above mentioned article as follows: "Thus Marine and Lenhart's statement that the normal follicles invade the bones is not appropriate, etc." We have never made such a statement nor could any one read into our descriptions of the normal fish thyroid such an interpretation without distortion. This author further states "In their paper Fig. 6 demonstrates this fact [that normal follicles do not invade bone] definitely, although it is supposed to show a true invasion." The author has evidently completely missed the point we wished to picture as the legend for this illustration clearly states that it represents the effect of iodin on the marked hyperplasias, i. e., the return or involution of the active and extreme epithelial overgrowth to its colloid or resting state. In this given fish the thyroid tissue had invaded bone, muscle, cartilage and had grown up to and elevated the pharyngeal mucosa. There was also extensive absorption of bone and erosion of cartilage which the microphotograph in question does not picture.

In another instance the author does not grasp the meaning we wish to convey when he says "if all glands, the follicles of which spread out far from the main bulk even into the gill region, are highly hyperplastic, then, according to Marine and Lenhart, the colloid material should be nearly or entirely absent in them. Yet it is present throughout the gland." There are all degrees of active epithelial hyperplasia and as the colloid content (as determined by staining and estimating the iodin content) in general varies inversely with the degree of active hyperplasia there are also all degrees of lessening of the colloid content. Now after extensive hyperplasia has taken place and the thyroid tissue has infiltrated all the surrounding structures including extensions into the gill arches, recovery may take place either spontaneously or from iodin administration, i. e., the active hyperplasia may cease from further growth and the epithelium return to a cuboidal form with the filling up of the follicles with colloid. This recovery implies the return to the colloid or resting state or the nearest normal state that such a thyroid can assume. The distribution of these now colloid follicles is, of course, just as extensive as when these same follicles were in their actively hyperplastic state, i. e., if the follicles have invaded bone, muscle, gill arches, etc., during their actively hyperplastic state they will remain in these locations throughout the life of the fish although the epithelium becomes cuboidal instead of columnar and the colloid content increases to the normal amount. In other words physiological recovery from the condition producing thyroid overgrowth (goitre) does not and cannot entail an absorption and disappearance of the follicles.

Just as there are slight departures from follicular uniformity as regards epithelium and colloid content in the normal thyroid so also in the actively hyperplastic thyroid the follicles show variations in the size of the epithelial cells and in the colloid content relatively more marked than obtains explanation at present, although it is probable that they are in part dependent upon the blood supply, the lymphatic drainage and perhaps upon other methods of interference with the follicle's nutrition which modifies the cells' activity. Thus it is well known that in secondary hyperplasia (hyperplasia occurring in a colloid gland) the peripheral or subcapsular zone undergoes hyperplasia earlier than the central portion and Ribbert[4] has shown in the experimental regeneration of dogs' thyroids following partial removal that the peripheral shows hypertrophic changes earlier than the more centrally placed follicles.

---

[1] Johns Hopkins Hosp. Bull. 1910, XXI, 95; J. Exper. Med., 1910, XII, 311; J. Exper. Med., 1911, XIII, 455.

[2] Johns Hopkins Hosp. Bull., 1911, XXII, 152.

[3] Simon, J.: Philos. Trans. Lond., 1844, Pt. 1, 295; Baber, E. C.: Philos. Trans. Lond. 1876, Pt. 2, CLXVI, 557; and *Ibid.*, 1881, Pt. 3, CLXXII, 577; Maurer: Morphol. Jahrb., 1885, XI, 129; Dohrn: Studien, XII, Mitteil. Zool. Stat. Neapel., 1887, VII, 301; Mueller, W.: Jenaische Zeitschr., 1871, VI, 428; Mackenzie: Proc. Canad. Inst., 1884, 134; Thompson, F. D.: Philos. Trans. Lond., 1910, Series B, CCI, 91.

These points are mentioned to show that in any phase of the histology of the thyroid one may place a too literal interpretation on slight variations in this very labile tissue which could not be detected at all in tissues less well endowed with the power of hypertrophy and hyperplasia. It is the general and predominating type of changes throughout the gland and not the accidental condition present in certain follicles that determine the state of the gland so far as functional activity is concerned.

---

[4] Virchow's Archiv f. path. Anat., 1889, CXVII, 151.

PNEUMOCOCCUS PERITONITIS.

WITH REPORT OF A CASE.

By Harvey B. Stone, M. D., Baltimore.

Pneumococcus peritonitis, not as a pathological finding, but s a clinical entity, presents a fairly well defined symptom-omplex, which should be better known and more generally ecognized than is the case at present. Although not one of ie exceedingly rare diseases, it is still sufficiently infrequent deserve reporting. These are the reasons which lead to the resentation of this paper, reinforced by certain features of iis particular case which seem of unusual interest.

The facts in the case are as follows:

Patient of Dr. Jeffries Buck, female, 5 years old, white.

Family History.—Not significant.

Past History.—Measles, whooping-cough, chicken-pox, pneu- nia two years ago, complicated by acute otitis media. After covery from pneumonia, the otitis persisted and became chronic th frequent exacerbations of earache and discharge. The last these flare-ups was on March 26, when the child cried at night th earache, was feverish, and awoke the next morning with isiderable discharge from the left ear.

resent Illness.—On the morning of March 30, following an in- cretion in diet of the previous evening, she was seized with lden severe abdominal pain and vomiting. There was also er and diarrhœa, the stools being of an exceedingly offensive r. It should be noted that other members of the family also fered from somewhat similar gastro-intestinal upsets, but hout fever being noted, and with rapid return to normal.

he child did not improve. The fever and the abdominal pain, ch was generally distributed, but most acute at the umbilicus, the diarrhœa persisted, in spite of calomel given to clear up chemical source of disturbance in the intestinal canal. On ch 30, the temperature reached 104.5° F. On March 31, Dr. k noted some fullness and tenderness of the abdomen with istence of the former symptoms and requested a surgical ultation.

ysical Examination.—5 p. m., April 1. Child sleeping. Tem- ture now 102° F., pulse 120, respiration 30. No visible dis- ge from either ear. Lips dry and cracked. Tongue coated. d awakened, but remained notably apathetic and continued uring the illness.

est.—Heart clear. Lungs entirely negative.

domen.—Slight symmetrical distention in lower half. Res- ory movements limited to chest and upper abdomen. No le peristalsis. On palpation, general tenderness all over men, most intense below level of umbilicus, but no difference between the two sides. No particular tenderness over appendix region. No masses felt. It was noted that rigidity was slight, much less than the other findings seemed to justify, and that the patient persistently referred the worst pain to the navel. Slight muscle spasm.

On percussion, no areas of dullness were noted. The liver dullness was pushed up about two fingers' breadth above the costal margin.

Rectal Examination.—Rectum ballooned. Tenderness all over vault of rectum. Pelvic organs felt normal. Vaginal discharge noted, which was later stained and showed Neisser's organisms. In this connection it should be noted that the child slept with an aunt who was known to have pelvic inflammatory disease.

As a result of the examination, there was a very definite impression obtained of some intra-abdominal trouble that might require surgical intervention. The picture was certainly not that of any of the usual lesions, however. Appendicitis, some form of obstruction, pelvic inflammation, and other conditions were considered unlikely, and it was felt that the case was obscure and unusual. As the child's temperature had come down two degrees, and the vomiting had ceased for several hours, and there seemed a general improvement, operation was not urged, but the child was placed in the Hebrew Hospital under observation. During the night, the temperature rose again to 104° F., the vomiting recommenced, tenderness and pain became greater, and the leucocyte count was found to be 18,400. An immediate exploration was decided upon in the morning.

Operation.—Through a right rectus incision the abdomen was opened, and at once thick greenish-yellow pus welled out, which resembled condensed milk quite closely in color and consistency. It was noted that the pus was odorless. A rapid search of the pelvis, the appendix, the gall-bladder, stomach and small bowel was made. No lesion accountable for the infection could be found. Everywhere the same pus, with numerous thick flakes of fibrin was found. The serous surfaces were noted as being much less injected than one would expect with so much free exudate. There was absolutely no walling off or abscess formation, every surface inspected being bathed in free pus. A diagnosis of probable pneumococcus peritonitis was made on the character of the pus and the absence of a definite visceral lesion. Cultures were made and stained slides were sent to the laboratory for examination. Gonococcal peritonitis was considered improbable as the pathological findings at operation all pointed against it. Closure of the abdominal wall, leaving space for free drainage, concluded the operation.

Bacteriological Report.—Pus from the abdomen showed a Gram-positive, encapsulated organism occurring in pairs and short chains; considered pneumococcus. A culture and smears made from the left ear immediately at the conclusion of the operation were negative. No discharge from the ear was visible at this time. A stain was also made from the vaginal discharge which, as noted above, showed Neisser's organisms—biscuit-shaped, intracellular Gram-negative diplococci.

Post-operative Course.—For a short time the patient seemed to rally, but the evening of the day of operation, her temperature rose steadily, she became delirious, and died the next day with all the symptoms of a profound intoxication, the temperature having reached 106.2° F., pulse 170. Post-operative treatment consisted in the same measures adopted for peritonitis in general—the Fowler position, the Murphy rectal saline solution, nothing by mouth, frequent subcutaneous infusions of normal salt solution. No autopsy was secured.

These are the general facts of the case. There are one or two features worthy of comment and a brief survey of the subject as a whole may not be out of place.

In the first place, here is a case of what has undoubtedly in the past been called "primary," "idiopathic" or "cryptogenic" peritonitis. Careful questioning, however, elicited a history of pneumonia two years before, with a complicating otitis media, the persistence of this otitis in the interval, and finally an acute flare-up of considerable intensity a couple of days before the onset of a peritonitis caused by pneumococci. Such a series of incidents is, of course, strongly suggestive. It is to be regretted that efforts to secure bacterial evidence from the ear were unsuccessful.

A second interesting point is the laboratory report of pneumococci from the peritoneum and gonococci from the vaginal discharge. An almost identical case was found reported by Dudgeon and Sargent,[1] who comment on this coincidence with a warning that the finding of specific organisms in the vaginal secretion of such a child does not necessarily mean the existence of a gonorrheal peritonitis. A third fact of note is that this case presents a very typical example of one form of pneumococcic peritonitis, and were such cases not so uncommon the diagnosis would not be extremely difficult before operation. In order to substantiate this statement a summary review of the subject is necessary. No attempt will be made at an exhaustive report of the literature, which is now quite extensive, although the disease is comparatively rare.

The disease was first described by Bozzolo[2] in 1885, as an autopsy finding, and first operated on by Sevestre[3] and Nélaton[4] in 1890. Since then numerous isolated cases have been reported, a number of extensive reviews of the subject have been published, and several theses and monographs written. In 1903 von Brunn[5] collected 57 cases occurring in children and 15 in adults. Jensen[6] published an exhaustive article in the same year. Annand and Bowen[7] in 1906 collected all the cases in children published up to that time, finding 91 under 15 years of age. In the same year von Robbers[8] reviewed the history and literature of the condition. Since 1906, in an extensive but not exhaustive review of the literature, 30 cases have been definitely recognized as pneumococcus peritonitis, while a number of papers have probably dealt with this condition, though unrecognized, under titles such as "Peritonitis without ascertainable cause,"[9] "General purulent peritonitis without obvious cause,"[10] etc.

Pneumococcus peritonitis occurs with marked preponderance in children, and especially in the female sex, between and 14 years of age. Various authorities differ as to the explanation of this incidence of the disease, but all agree as to the facts.

Etiologically, the disease, of course, represents a specific infection of the peritoneum, but much discussion has risen as to the portal of entry. Two groups of cases are usually recognized: the primary or idiopathic, and the secondary, in which the peritonitis is obviously consequent to some pre-existing pneumococcic lesion elsewhere. Of such lesions, pleuro-pneumonic involvements are naturally by far the most common, and next to these, in frequency, is otitis media. The recognition of a "primary" form as a distinct group does not seem logical. It simply means that the portal of entry, instead of being obvious as in a precedent pneumonia, is obscure. The modes of transmission accepted as proved by various writers embrace operative infection, transmission by blood and lymph streams, and direct penetration, with or without perceptible lesion, of the diaphragm and the walls of the gastro-intestinal canal.

Clinically the cases fall into two fairly distinct groups—the encapsulated and the diffuse forms, each of which presents a characteristic picture. The encapsulated form begins with a sudden onset, in a number of cases following an indiscretion in diet, with acute abdominal pain, vomiting and fever. In an overwhelming majority of cases, but not in all, there is diarrhœa generally characterized by the very fetid odor of the stools. The local abdominal signs at this stage and in this form are not very pronounced. The vomiting stops in from 12 hours to a few days. The fever, never very high, persists from 8 to 10 days. The diarrhœa is the last of these early symptoms to cease. After ten days or two weeks, local abdominal disturbances become more pronounced. The pain, which may have stopped, begins again, and instead of being general, becomes localized, nearly always in the hypogastric region. Fullness, gradually but steadily progressing, is noticed. Over this distended area dullness on percussion, fluctuation, and occasionally œdema of the abdominal wall develop. These symptoms, again accompanied by fever, become more pronounced, and unless interrupted by death or operation, a spontaneous rupture nearly always through the umbilicus affords escape for the pus. Three stages may thus be recognized—peritoneal invasion, accumulation of exudate, and spontaneous rupture. The prognosis in this form, which undoubtedly represents a relatively benign infection, is good. Annand and Bowen report 86 per cent recoveries in 45 cases of this type.

In the diffuse form of the disease, the symptoms of onset are the same—sudden abdominal pain, vomiting, diarrhœa, fever—but they are all much more intense than in the local-gh, always quite high, often ranging well above 4° F. In these cases the virulence of the infection is much eater than the natural defence of the individual. Death may cur in 24 hours. Where the course of the disease is less rupt, there is often a brief apparent improvement at the end about 48 hours. In a short time, however, the symptoms ow more marked, abdominal distention, tenderness, perhaps ovable dullness become apparent. In short, the picture of ritonitis develops, with interesting qualifications, rigidity a rule being far less marked than the other symptoms uld seem to justify, and there is diarrhœa instead of conipation. There is a high leucocyte count, very elevated temrature and profound toxæmia. The prognosis is exceedgly grave. No such case has survived unless operated on. nand and Bowen, in 46 cases, 18 of which were operated , record only 6 recoveries, 14 per cent.

The pathological findings, aside from the determination of e specific organisms, consist in the character of the exudate. his is, in most instances, thick, creamy, greenish-yellow, and orless. In a few cases, however, the pus has been described profuse, thin and of a turbid, dirty brown color. In either rm the presence of numerous flakes and deposits of fibrin characteristic. Several writers have noted that the degree injection of the peritoneal surfaces seemed slight in prortion to the amount of exudate present.

The treatment of any form would seem to be immediate parotomy and drainage, for the obvious and time-honored rpose of evacuating pus. There are, however, a few dissentg voices from this opinion. Thus Nobécourt[11] thinks it unse to operate too early, as in all cases surviving the first few ys the infection will localize and then there is less danger, in opinion, of its being spread by the operator. Manifestly s is simply leaving unaided nature to fight its own battle, l if it wins, doing nothing more than forestalling the sponeous discharge of the pus. The cases which succumb are least, would be saved. Naturally the prognosis is better in cases first seen in the stage of localized abscess, but nothing is gained and much may be lost by allowing early cases to wait in hopes that walling off will occur.

To summarize: Pneumococcus peritonitis occurs more often in children than in adults, and more often in female than male children. There are two forms: the encapsulated, which exhibits a first period of invasion, a second period of localized abscess formation, and a third of spontaneous rupture of the abscess; and the diffuse form of general peritonitis rapidly fatal unless operated upon. The symptoms of onset in both forms, varying only in intensity, are abdominal pain, vomiting, fever, and diarrhœa. Rigidity is not characteristic. The treatment is surgical intervention as soon as possible. The prognosis of the diffuse form is very bad; of the localized form, fairly good. The pus is characteristic, and often sufficient for diagnosis from its macroscopic appearance alone.

In conclusion, I wish to express my indebtedness to Dr. Ney, of the Hebrew Hospital, for his kind assistance in placing the hospital records of the case at my disposal.

BIBLIOGRAPHY.

1. Dudgeon and Sargent: The Bacteriology of Peritonitis, London, 1905. A. Constable & Co.
2. Bozzolo: Centralbl. f. klin. Med., 1885, VI.
3. Sevestre: Bull. et mém. Soc. méd. d. hôp. de Par., 1890, 3 S., VII.
4. Nélaton: Bull. méd., Par., 1890, IV.
5. v. Brunn: Beitr. z. klin. Chir., Tübing., 1903, XXXIX.
6. Jensen: Arch. f. klin. Chir., 1903, LXIX.
7. Annand and Bowen: Lancet, Lond., 1906, I.
8. v. Robbers: Deutsche med. Wchnschr., 1906, XXXII.
9. Williams: Brit. M. J., Lond., 1907, I.
10. Scannell: Boston M. & S. J., 1906, CLIV.
11. Nobécourt: Rev. gén. de clin. et de thérap., Par., 1910, XXIV.

AN ANOMALOUS DUCT BELONGING TO THE URINARY TRACT.*

By Paul G. Woolley, M. D.,
Professor of Pathology, University of Cincinnati,
and
Herbert A. Brown, M. D., Cincinnati.
(From the Laboratories of the Cincinnati Hospital.)

he specimen we wish to describe is of unusual interest use of its extreme rarity, for, in spite of a somewhat staking search of the literature we have found no account ny similar condition. It was found during the posttem on a patient in the Cincinnati Hospital (No. 153426) had been admitted for cutaneous blastomycosis, and who of the generalized form of that disease.

ecause none of the symptoms of the patient could be red in any way to the condition of the genito-urinary tract hall omit the history and the report of the autopsy, and confine ourselves to an account of the condition only as it referred to the specimens. We believe that the case has been discussed from the dermatological standpoint by Dr. Ravogli.

The left kidney weighed 200 gms. The capsule stripped with slight difficulty and left a moderately roughened, almost nodular surface. The cut section was rather pale, and the line of demarkation between cortex and medulla was indistinct. The cortex was of about normal thickness. The blood vessels were sclerotic. The right kidney showed the same general appearance. The left adrenal showed a somewhat evident hyperplasia of the medulla. The right adrenal was apparently absent.

---

ad before the Cincinnati Society of Medical Research, May 1.

Extending from the antero-mesial aspect of the upper pole of the right kidney, that is, from the normal site of the right adrenal, appeared a distended, tortuous, saculated tube, which ran parallel with the right ureter which it finally passed to enter the posterior surface of the prostate (Fig. 1). The average diamater of this sac was about 2 cm. In its wider parts it was distended to about 4-5 cm. At its lower end it was rapidly constricted, almost to occlusion. Through the lower end a fine probe could be passed into the posterior urethra at the site of the sinus pocularis. In the immediate vicinity of the prostatic part was a blastomycotic abscess which involved, to a minimal extent, the wall of the duct. The upper part of this distended duct ended in a mass of tissue of about 2 x 1 x 1 cm. in size, which was taken to be the remains of an atrophic adrenal and which later proved to contain only one small area which in anyway resembled adrenal tissue. This mass also contained abscesses. There was no connection whatever between the tube and the kidney, ureter or bladder. The pelvis of the kidney was not dilated. Both testicles were present and had undergone descensus.

In the expectation that sections of the specimen would be of some asistance, bits of tissue were taken from the nodule of tissue at the renal extremity, from the sac at its origin near this renal nodule and from the prostatic portion of the tube. The blocks of tissue taken from the uppermost part included the nodule itself and the kidney so that comparison could be made in the same section.

The sections made from these blocks can, for the purposes of description, be divided into three parts; one, representing the mass of the nodule; a second representing the kidney; and a third, the boundary zone between nodule and kidney.

The tissue of the first part was for the most part well-formed fibrous tissue enclosing large and small cystic spaces, large and small blood vessels, nerves, collections of epithelial cells (columnar, as a rule, occasionally cubical), which seem to represent cross sections of ducts (Fig. 6), and blastomycotic abscesses. The larger cystic spaces were lined with a single row of cuboidal epithelium and filled with a granular albuminous material in which masses of desquamated epithelium, polymorphonuclear leucocytes, giant cells, and blastomyces, were imbedded. The smaller cystic spaces were of two particular forms. One form was lined with one or more rows of cylindrical or high columnar epithelium and filled with desquamated cells, cellular detritus, leucocytes, and extra- and intra-cellular blastomyces; the other was lined with one or more layers—usually a single layer—of cuboidal epithelium and contained a material that resembled thyroid colloid (Fig. 4). Occasionally this colloid showed concentric lines and in some cases it was so changed that it stained with basic dyes and appeared quite similar in appearance to the corpora amylacea of the prostate (Fig. 5). As a rule, however, they were rather more irregular than the ordinary prostatic corpora amylacea, and had a striking resemblance to other similar bodies that are occasionally present in the ovary and other organs. The blood vessels had, as a rule, thickened walls and in the majority of instances showed endothelial prolifieration, even, in some cases, to the point of obliteration. The nerves showed no abnormalities, either in cross or longitudinal sections. No ganglion cells were observed.

The tissue of the second part represented merely a narrow zone of kidney tissue in which there were general changes that taken collectively indicated a chronic diffuse nephritis of moderate severity.

The boundary zone between the two parts already described was composed of fibrous tissue that firmly united the kidney and the nodule. This zone was of some little width, but the line of demarcation was narrow, and was represented by a narrow line of renal capsule. In but a few sections, close to the kidney, and yet separated distinctly from it were small localized masses of tissue, glandular in structure, and quite similar to the tissue that is seen in adrenal and renal adenomas, and in which was no sign of ganglion or chromaffin cells (Figs. 3 and 4).

The general impression given by these sections was that one was dealing with a possible combination of renal, adrenal and ovarian tissue indifferently arranged. Drs. Knower and Wieman have suggested the occasional resemblance to a Wolffian body.

The sections from the sac itself at the upper and lower ends show that the walls of the sac were composed of fibrous tissue with a minimal number of smooth muscle fibers and were lined with low columnar or cuboidal epithelium (Fig. [illegible]).

There are, under more or less normal circumstances, possibilities of but three openings into the prostatic urethra—two, the openings of the ejaculatory ducts, which were present in this case, and one, the opening of the united Müllerian ducts.

There is also the theoretic possibility that as a result of embryonic developmental variations as suggested by Pohlman the ureter might open into the prostatic urethra. Pohlman says that in changing its position on the Wolffian duct from dorsal to lateral, at which time the ureter comes to open distinct from the Wolffian duct and would naturally open in common with it or into parts developed from its lower end, or "the ureter might open laterally to the Wolffian duct and on a level with it. The opening in this case would be found in the prostatic urethra."

If this be a true explanation, then the mass of tissue above the kidney is the remnant of an atrophic or hypoplastic kidney, or it is the remains of the Wolffian body. In the former case we should be dealing with a unilateral multiplicity of kidneys, each with its ureter, one of which opens into the prostate; in the latter we should have to consider that the duct was the result of persistence of the united Wolffian duct and ureter.

There is the other possibility that in this case we are merely dealing with an abnormal course of a complete ureter without any participation of a Wolffian duct, as occasionally happens in cases with accessory ureters. It is to be noted that in such cases the one of the ureters, usually the one which

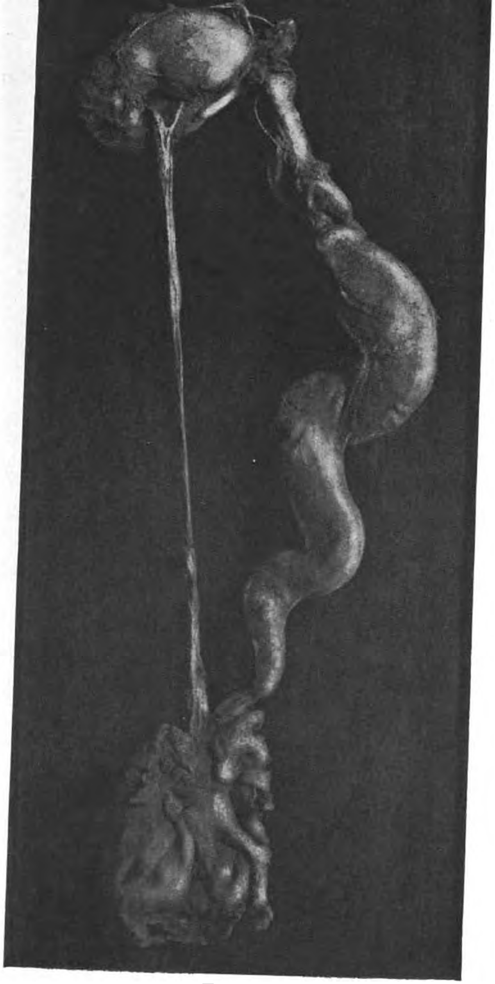


Fig. 1.

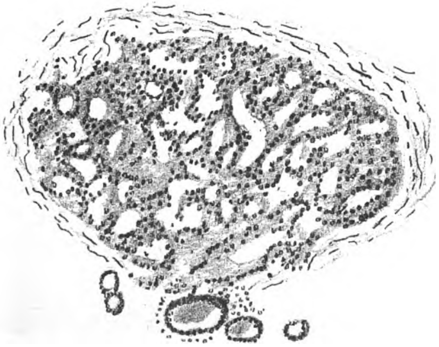


Fig. 2.

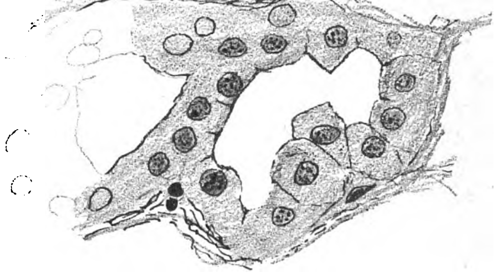


Fig. 3.

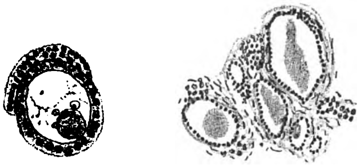


Fig. 4.

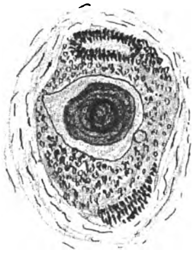


Fig. 5.

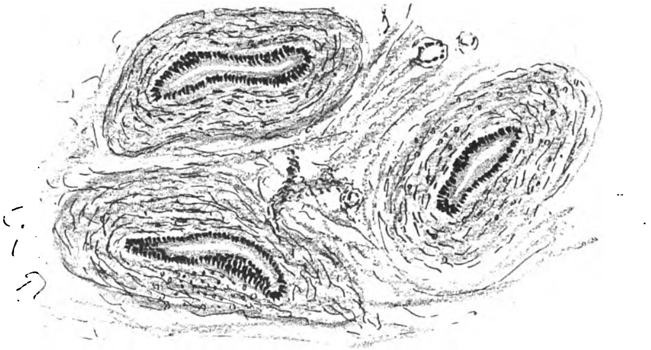


Fig. 6.

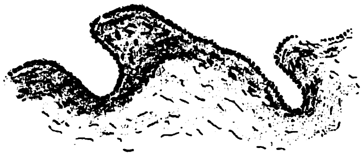


Fig. 7.

the seminal vesicle. any case we cannot account for absence of the adrenal ept on the basis of aplasia, or perhaps—if the nodule men- ed above be adrenal—hyperplasia. Either of these re- s, it might be suggested, may be the result of the develop- t of accessory renal tissue at the expense of adrenal. The ryonic relationships of the urogenital organs are so close the possibilities of variations are very numerous. Mar- d emphasized this from the side of the genito-adrenal ns when he suggested that variations in the sizes of nals and ovaries cannot be considered as purely fortuitous. is our misfortune that the anatomic evidence at our dis- l is not sufficient to permit us to come to any decision as hether we are dealing with the result of one or the other e possibilities mentioned.

Pohlman: *Amer. Med.*, 1904, 987.

Marchand: *Intern. beiträge z. wissensch. Med.* Virchows Festschrift. Bd. 1.

Aschoff: *Pathologische Anatomie.* Jena, 1909, Bd. 11, S. 506.

Kaufmann: Specielle Pathologische Anatomie. Berlin, 1907, S. 773.

ILLUSTRATIONS.

1. A photograph of the gross specimen.
2. The adrenal (?) rest.
3. Same as 2, enlarged.
4. Cystic spaces showing colloid.
5. Cystic space showing corpus amylaceum.
6. Ducts in the nodule above the kidney.
7. Wall of the large duct.

All of the illustrations except 1 and 3 were drawn with a camera lucida at table height using a Leitz ocular IV and obj. 3. Figure 3 was drawn with a Leitz ocular IV and a Spencer 4 mm. A. 0.80 objective.

UTE CHOLECYSTITIS WITH LARGE AMOUNTS OF CALCIUM SOAP IN THE GALL-BLADDER.

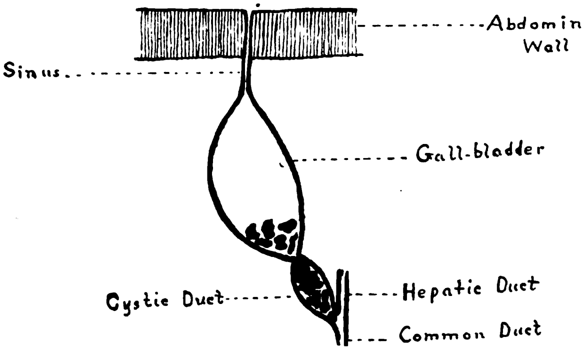
By John W. Churchman, M. D.,
Late Resident Surgeon, The Johns Hopkins Hospital.

view of the great frequency with which the gall-bladder rained under conditions identical with those present in patient whose case is here reported, the absence of any lar case in the clinical literature emphasizes the unique- of the observation here made. Moreover—though soaps found in small amounts in the bile—I have been able to no reference, in the chemical literature of the subject, to ll-bladder contents composed almost entirely of soap.

here was nothing unusual about the clinical features of case. The patient presented the typical picture of an cholecystitis. She had never had typhoid fever. The ss began two days before admission with chills, fever, and neral aching. Delirium appeared that night; and the day there was abdominal pain—at first general, later ized in the right side and radiating to the right shoulder. ea and vomiting were present, but there was no jaundice. physical signs were those of acute cholecystitis. The gall- ler was not palpable. The liver was slightly enlarged.

the operation straw-colored fluid was found in the peri- l cavity, cultures from which remained sterile. The ap- x was normal, but the gall-bladder was distended and inflamed. After isolating it with gauze, it was aspi- ; but instead of the pus which was expected a fluid, un- nything previously seen in the gall-bladder, appeared in arrel of the syringe. The color of this material but particularly its strange odor (suggesting a mixture of ver oil and turpentine) recalled the contents of a mes- c cyst operated on a few days previously; and it was moment uncertain whether what had been supposed to l-bladder might not prove to be a cystic growth of the On opening it, however, a large number of bile-stained were found and removed. There was neither bile nor pus in the gall-bladder. The cystic duct was completely blocked by stones. The contents of the distended gall-bladder consisted entirely of a material like that which had been aspirated. The gall-bladder was drained in the usual manner. Convalescence was without event. Three small stones were found in the tube at the first dressing. The discharge from the biliary fistula was at first brownish, later purulent, then thin and mucoid; but it never contained bile.

The wound healed to a pin-point opening, through which the limpid mucoid material, characteristic of hydrops, continued to drain. The sinus persisted, causing the patient almost no inconvenience, but discharging at intervals. After a year had elapsed, she returned to have it closed. At this operation, the gall-bladder contained much clear mucoid fluid (from which no organism could be grown) and a few facetted, pigmented stones. The distended cystic duct contained many gall-stones and communicated with the gall-bladder by an opening so small that the stones could only with great difficulty be delivered into it. (See diagram.)



The common and hepatic ducts contained no stones. The usual drainage was carried out. Bile appeared in the sinus on the seventh day and soon became profuse. The wound closed promptly and has remained healed.

The strange material removed from the gall-bladder at the first operation was grayish-white in color, glistening, opaque in mass, but slightly translucent in thin layers. It was fluid enough to run into a large aspirator, but its consistency was somewhat that of tooth paste and it could be picked up in mass. It had no property of adhesion whatever, and when handled, failed to come into intimate contact with the skin of the finger, from which it was separated, apparently by a thin layer of oil. None of it stuck to the finger, though its peculiar oily odor remained on the skin. It was ductile and could be pulled out in strands, like pulled candy; but it was somewhat elastic.

An agar slant was inoculated with some of the material and *B. typhosus* grew out in pure culture. The patient's Widal reaction was taken and found positive. It is interesting that cultures made from the gall-bladder at the second operation, one year later, were negative.

A chemical analysis of this material (kindly made by Dr. Slagle) showed it to consist largely of soaps of the calcium salts. Some free fatty acids were also present, but no bile pigments.

There is nothing in the secretion of the gall-bladder proper from which the soaps here present could have originated. This secretion has been carefully analyzed in two cases presenting biliary fistulæ and occluded cystic ducts, and the following composition found.[1]

Water and gases		979.7
Solids		20.3
Organic	Mucin Albumin (a trace)	12.09
Inorganic	Chlorine. Carbon dioxide. Sodium (combined with chlorine). Sodium (combined with CO_2). Potassium salts and phosphates.	

These findings agree with other examinations of the gall-bladder secretion.

Hammarsten's analyses of the bile in the liver and in the gall-bladder showed the fats, soaps and fatty acids to be more abundant in the latter situation. His figures are as follows:

COMPOSITION PER 1000 PARTS OF BILE.

The averages of Hammarsten's figures are here given approximately

	Liver Bile.	Gall-bladder Bile.
Water	About 970	About 835
Solids	" 30	" 165
Mucin and Pigments	" 5	" 42
Taurocholate	" 3	" 23
Bile acids and Alkalis	9+ to 18+	87 to 96
Glycocholate	6+ to 16+	67 to 69
Fatty Acids and Soaps	1+	About 11
Cholesterin	.6 to 1.6	" 9
Lecithin Fat	.2 to 1.5	4 to 7
Soluble Salts	6 to 8	About 8
Insoluble Salts	.2 to .5	" 2

The analyses of other investigators, though the figures have shown some differences from those of Hammarsten, agree as to the substances found and, in an approximate way, as to their relative proportions. All observers have found a small amount of fatty bodies (fatty acids, soaps, fats and lecithin), but none have found them in any such preponderance as was the case in this patient.

---

[1] Birch and Spong: Journal of Physiology, Cambridge, 1887, VIII, 378.

NOTES ON NEW BOOKS.

Progressive Medicine, Vol. I, March, 1911. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M. D. (*Philadelphia and New York: Lea & Febiger, 1911.*)

The most important European and American articles on recent advances and theories in the treatment of the "Surgery of the Head, Neck and Thorax," "Infectious Diseases, including Acute Rheumatism, Croupous Pneumonia, and Influenza," "Diseases of Children," "Rhinology and Laryngology," and "Otology," are reviewed in this volume with the usual care and skill shown by the contributors. This work is of value to any practitioner who wishes to keep himself well informed on the progress of medicine in all its branches—a progress which is steady though sometimes necessarily slow.

A Text-book of General Bacteriology. By EDWIN O. JORDAN, Ph. D. Fully illustrated. Second Edition. Thoroughly Revised. Price, $3.00. (*Philadelphia and London: W. B. Saunders Company, 1910.*)

As errors have been corrected and omissions repaired, which appeared in the first edition of this work, and several new sections added, its real value, to which attention was drawn in our issue of July, 1909, has been increased, and it is fortunate that students have such a useful and reliable book to guide them in their studies.

Accidental Injuries to Workmen, with Reference to Workmen's Compensation Act, 1906. By H. NORMAN BARNETT, F.R.C.S., etc. With Article on Injuries to the Organs of Special Sense by CECIL E. SHAW, M. D., etc. And Legal Introduction, by THOMAS J. CAMPBELL. Price, $2.50. (*New York: Rebman Company, 1911.*)

This work is more adapted to the use of the English profession than to our own, but since injuries to workmen are as frequent here as elsewhere, and since the question of the proper responsibility in such cases is steadily becoming more acute in this country, and more and more accident cases are being taken into court, it is most satisfactory that American doctors should have such an excellent book to study when they have to deal with "accidental injuries, mechanical and chemical, to the various organs and tissues of the body, including those of special sense." The treatment of such injuries properly finds no place in this work, but diagnosis is fully discussed, and also the remote effects of injuries. This is in fact a text-book to guide physicians how to study an injury which may result in a suit for damages. There

glad to be able to call
ir attention to it, for the author has handled his material
lfully and written interestingly. The publishers are also to be
nmended for the quality of the paper which makes the book
ht and easily held in one hand—so many publications are
msy and fatiguing to hold.

rgery of the Brain and Spinal Cord. Based on Personal Ex-
periences. By Prof. Fedor Krause, M. D. Translated by
Prof. Herman A. Haubold, M. D. Vol. I. (*New York: Rebman*
Company, 1909.)

n his introduction to this work Prof. Krause states that he does
attempt to offer a text book on neurology but "to present
nerous illustrations from nature which are destined to con-
ute an accurate picture of the status of the surgery of the brain
spinal cord as it stands at this writing." The work therefore
s not take up the pathology, pathological physiology, sympto-
:ology, and diagnosis of surgical neurological conditions, but
ls with some of the surgical problems relative to these condi-
ıs and the surgical procedure used in attacking them which in
author's hands have proven most satisfactory. It is evident
n his introduction that Prof. Krause still holds the view that
internist and neurologist should make the diagnoses of sur-
ıl neurological conditions for the operating surgeon; a view
h which we are not at all in accord.

book dealing with such a special branch of surgery will have
ırying degree of usefulness. To the general surgeon who has
little or no special training in neurological surgery it will be
great aid, for the author has had a large experience in this
ıch of work and the technic he describes in dealing with va-
s intracranial lesions is superior to that employed by the
rage general surgeon. To those who intend to devote them-
es to neurological surgery the book will be a valuable addi-
, for the author has appreciated and correctly grasped many
ıe problems which tend to make neurological surgery a special
of work. To the relatively few who have had considerable
rience in the surgery of the brain, this volume will be an in-
sting exposition of a single operator's technic and experiences
eurological surgery, but will offer little that is especially new.
ıe first 50 pages of the book are devoted to trephining, the
rol of hemorrhage from scalp and bone and the method of
ing osteoplastic flaps in the approach to lesions in different
ıns of the brain. It would seem that the method of Von
lenhain or the plates of Kredel which he employs for the con-
of hemorrhage from the scalp are unnecessary and time-con-
ng procedures. A well fitted tourniquet practically always
s the purpose. He describes various methods for controlling
rrhage from the bone, but admits total inexperience with the
useful of methods, i. e., the use of Horsley's wax. In the
ation of osteoplastic flaps he rightly, we think, advocates the
of hand-driven instruments rather than electrically-driven
es. His flaps could be improved upon; a bevelled upper edge
with a Gigli saw prevents the flap from pressing down upon
ura; and if the base of the flap is made narrow and directed
ward toward the temporal region it can be fractured and the
f injury to dura by cutting across it avoided. In agreement
many operators Krause prefers a two stage operation, the
tage ending with the formation of the bone flap. He speaks
frequency of collapse at the end of the first stage; an occur-
which we have very rarely seen. Collapse at this time must
undue hemorrhage although Krause states that it often
without much loss of blood. While two stage operations
ıdoubtedly necessary in some instances, we have been ac-
ıed to see the entire operation completed at one sitting; and
ıly a one stage procedure is to be preferred if it can be ac-
ished with no additional risk to the patient.

factory. He employs a sitting position which is not only difficult to maintain but is bad for the patient, trying to the anaesthetist and inconsistent with perfect asepsis. Certainly the position used by Cushing is greatly to be preferred. Krause makes use of a unilateral osteoplastic flap which in states of increased pressure must be a difficult and bloody procedure. The exposure of only one cerebellar hemisphere does not allow sufficient dislocation for a complete and satisfactory exploration; indeed, it is only by a wide exposure of both hemispheres tnat a complete exploration of the cerebellum and lateral recesses is possible. Experience teaches that a lesion, such as a cyst, occupying one hemisphere may by pressure cause symptoms entirely referable to the opposite intact lobe; and therefore it is possible that a lesion might escape detection with a unilateral exposure.

His treatment of various lesions of the brain exposed at operation he describes for the most part by citing examples from his series of cases. In the main his treatment is good. He recognizes the necessity of preventing injury to vessels which may cause post-operative cerebral softening, of careful control of hemorrhage and of preventing injury to the pia-arachnoid. It would appear that he drains too frequently. He packs cyst cavities with gauze to obliterate them; we believe that every effort should be made to remove the cyst wall even though thin. He has observed the rapid obliteration of cavities left after removal of tumors or other lesions, but often drains these cavities, which, with careful control of hemorrhage, is unnecessary.

For unlocalizable lesions causing pressure symptoms he does a decompressive operation which is a modification of his osteoplastic flap operation. The objections to it are that the defect is made in a region protected only by scalp; and that it is as extensive, if not more extensive than an osteoplastic flap resection. Compared with this method the simple procedure conducted under the temporal muscle as described by Cushing would seem vastly superior; and we feel that Krause does not at all appreciate the advantages of this method. He does not make use of the method employed by Horsley.

The closure of his wounds is not done with sufficient care, and it would appear that this fact is largely responsible for the number of cases of post-operative fungus or brain prolapse which appear in the volume. Undoubtedly the complication should be less frequent. He does not apparently suture the dural flap made at operation but simply lays it back over the cortex. This seems particularly bad especially if there is increased pressure; for the cortex immediately bulges through the dural defect and adhesions, if not a fungus, result. To conduct a second operation at some future date through a wound closed in this manner would indeed be difficult. The dura must be closed with the greatest care and if any opening is left in it, this should be under some protected region, as under the temporal muscle. Sometimes even the scalp is not sutured but simply held in place with dressings. As previously stated he drains his wounds too frequently; he packs cystic cavities and those left after the extirpation of tumors—procedures which in the presence of increased pressure tend to favor fungus formation.

In all his operations chloroform is used. The operator does not wear gloves. He believes that rapidity of technic, control of hemorrhage and asepsis are the essential factors for success.

As customary in works on brain surgery he devotes many pages (20) to cranio-cerebral topography. He appreciates the difficulty of recognizing the pre- and post-central gyri even when the cortex is exposed; yet he always marks the fisures of Sylvius and Rolando on the scalp the day before operation.

He considers brain puncture and believes it a definite aid in the diagnosis of intracranial lesions. He warns however against the dangers of this procedure. He himself has had several cases of bleeding and in some others an aggravation of symptoms already present. He mentions the possibility of causing hemorrhage into the ventricle and of encountering a vascular tumor such as an angioma. It would seem pretty definite that this procedure should be used only when the needle can be introduced under direct inspection.

He describes ventricular puncture, giving the various points of election for introducing the needle, but does not take up the indications or contraindications for this procedure. He gives the various methods for accomplishing permanent drainage of the ventricles. As a preliminary to exploration of the cerebellum in cases with extreme tension he does a ventricular puncture which is a very useful procedure.

The translation has been rightly estimated by the translator in his preface. His attempts to follow the German too closely have in many places been made at the expense of good English. The volume is elaborately illustrated with 24 colored plates, some of which are very good, others less well done and showing little detail. The other illustrations are as a whole poor. The print is large and legible with perhaps too frequent use of bold-faced type. The size of the volume is unnecessarily large. In scientific works, with few exceptions, it seems to us a mistake to publish a volume with such broad margins.

The Treatment of Syphilis with Salvarsan. By SANITÄTSRAT DR. WILHELM WECHSELMANN, of Berlin, with an Introduction by PROFESSOR DR. PAUL EHRLICH, of Frankfort-on-Main. Only Authorized Translation by ABR. L. WOLBARST, M. D., of New York. Price $5. (*New York and London: Rebman Company. 1911.*)

Wechselmann's experience with the use of salvarsan has been larger than that of any other physician, since he was one of the first chosen by Ehrlich to try the new remedy. In this work Wechselmann gives us the result of his studies of 1400 cases treated, and what he has to say is of importance to all physicians who are using this drug. The profesion at large is now pretty well acquainted with the value, danger, and other characteristics of the medicine, but here we have an as authoritative book on the entire subject as can be had up to the present time. With the lapse of a few years after the discovery of the drug new views may be held in regard to it, but at present this book can but serve as a most valuable guide to all students, for the author has considered all the essential points in regard to the administration of salvarsan. It is well translated and the few illustrations excellent.

Cholera and Its Treatment. By LEONARD ROGERS, M. D., F. R. C. P., F. R. C. S., I. M. S., etc. Price, 4s. (*London: Henry Frowde and Hodder & Stoughton, 1911.*) *Oxford Medical Publications.*

Dr. Rogers has had a large experience with cases of cholera in the Medical College Hospital at Calcutta, and he has written a valuable and interesting work on this disease. The six chapters cover the following ground: 1, History of Cholera Epidemics and Their Lesions; II, Epidemiology; III, Etiology and Prophylaxis; IV, Clinical Description; V, Morbid Anatomy and Pathology; VI, Treatment. As in this country few physicians ever have the opportunity to see a case of cholera, this book is not likely to have many readers; but the student of tropical diseases will find it a useful book to have in his library, and will give especial attention to the chapter on Treatment, in which the author sets forth the results of the simple means used by him and by which he has been able to distinctly lower the percentage of mortality in his wards. He advocates the use of infusions of salt solution to lower the concentration of the blood resulting from the frequent evacuations; and also the administration of permanganate of calcium to destroy the toxins produced in the body by the cholera germs. With a combination of these two methods his results have been most favorable, and they deserve to be further tried. The author is modest in his claims as to the value of the treatment, which has at least one great merit, that it seems to do no harm, even if its importance prove less marked with further trial.

Manual of Human Embryology. Edited by FRANZ KEIBEL and FRANKLIN P. MALL. In two volumes. Volume 1 with Illustrations. (*Philadelphia and London: J. B. Lippincott Company, 1910.*)

In the introduction to this volume the editors announce their intention of adhering strictly to human embryology, and of not concealing the gaps which exist in the subject as is sometimes done. They assume rather the very praiseworthy attitude of especially pointing out these deficiencies, as in this way the gaps will be sooner filled.

Comparative embryology is largely excluded and is only introduced in the discussion of the early stages of development.

It is interesting to learn that this treatise on embryology which was projected by His and Keibel has been completed by Keibel and Mall, one of His's most noted pupils.

This is the first manual of human Embryology to be written conjointly by a number of authors, a method which has lately been frequently adopted in other books. Such books are subject to two dangers: first, a lack of unity, and secondly, repetition. These dangers have been avoided here however by very thorough editing and supervision, proved also by the fact that a careful reading of the book has shown a remarkable absence of typographical or other errors. The advantage of a multiple authorship is a greater thoroughness and accuracy of discussion, each author being especially qualified for his task by his own researches.

The reason given for an exclusive human Embryology is the importance of the subject to the physician.

Keibel in his introduction considers the historical development of Embryology, and one is pleased to note that great credit is given to that remarkable genius von Baer and also to His who laid a secure foundation for human Embryology and made possible the great advances of the last 30 years. Keibel calls attention to the spirit of co-operation which is permeating the scientific world, and acknowledges his indebtedness to many investigators. This spirit is part of a broader movement affecting educational institutions which no longer are rivals but rather coadjutors. This volume was published simultaneously in German and English, the English translation being made by McMurrich and the German by Keibel.

Keibel contributes articles on the germ cells, fertilization, segmentation, young ova and embryos up to the formation of the first primitive segment, germ layers and gastrulation and differentiation of external form.

Grosser writes on the egg membranes, placenta and menstruation.

Mall's contribution includes the determination of the age of human embryos and fetuses, the pathology of human ova and the development of the coelom and diaphragm; Pinkus discusses the development of the integument, Bardeen the development of the skeleton and connective tissues, and W. H. Lewis the development of the muscular system.

Keibel's discusion is an excellent one. He accepts Waldeyer's view that at birth or shortly after all oögonia have become oöcytes of the first order and so have before them only further growth and maturation. It is questionable whether the introduction of the term "polocyte" for "polar globule" is desirable. A fuller discussion of sex determination should be given. Keibel's statement that most observers now incline to the belief that sex is always determined in the ovum before fertilization is, in the opinion of the writer, not justified. There is considerable evi-

on accessory chromo-
es. Attention is called to the desirability of examining the lucts in the hope of finding early embryos. Keibel critically ews the early embryos which have been described and thinks chert's ovum has been detrimental to the progress of Embry- y because of the wrong impressions created.

the discussion of the formation of the germ layers he does reader a service by stating precisely what he means by gas- ation. He defines it broadly as follows: "Gastrulation is process by which the cells of the metazoan ovum are separated an upper and lower layer." Attention is called to the gap ch exists between Pfannensteil's embryos III and VI of the *mentafel* of Keibel and Elze. Embryos 3, 4, and 6 of His he iders abnormal.

rosser gives an excellent account of the method of placenta- and explains his classification of placentæ, which is based on extent of erosion of the decidua. According to his nomen- re the human placenta is a *placenta hæmochorialis discoidalis ormis.* This is the highest type and is not yet reached by the ropoid apes. His statement that the endometrium undergoes nsive degeneration in menstruation is, to say the least, mis- ing. He calls attention to the important fact that the pres- of furrows in the endometrium may be indicative of preg- y and that pathologists, bearing this in mind, may help ryologists to obtain early ova.

speaking of the increase in size of the uterus in pregnancy. rrect use is made of the terms Hypertrophy and Hyperplasia. page 99 lymph nodes are spoken of as existing in the en- etrium; we think this should be "nodule," as lymph node ld be used as the equivalent of lymph gland.

termination of the age of human embryos and fetuses is dis- ed by Mall with his usual clearness and keen analysis. One is what surprised at the statement, quoting Ravano, that ovula- occurs frequently during pregnancy. He emphasizes the ssity of a standardization of the *corpora lutea* as an aid to determination of the age of ova, and makes the important estion that surgeons might materially assist in this matter by tine examination of normal ovaries in abdominal sections.

concludes that the balance of evidence is against the ert-His theory and in favor of fertilization occurring near ime of the last menstrual period. The crown-breech and -heel measurements are considered the best, corresponding ey do with the sitting and standing height of anthropolo-

he discussion of the pathology of the human ovum. Mall in- rates largely his studies already published. He has found 0 per cent of the ova of the first two months received by re pathological, and considers the causes secondary and en- nental rather than germinal. Changes in the chorion are in a very large percentage of pathological ova, and inflam- of the decidua is regarded as a frequent cause. A classifi- of pathological ova is explained. He believes with aini that as abortions are frequently due to pathological s in the ova, threatened abortions should rather be en- ed than prevented, for if retained the embryos may become rs.

onsiders that the evidence from various sources including Experimental Teratology indicates that the causes of mon- es are rather environmental than germinal and calls atten- the importance of treatment of the diseased endometrium e cases where monsters have been born, to prevent a repe- His statistics show that seven per cent of all pregnancies pathological ova. This discusion is a valuable contribu- ur knowledge of the subject.

article on the development of the diaphragm and cœlom ts in a large measure his own researches in the subject.

Pinkus. His article includes the consideration of skin pigmentation, dermal ridges and folds, metamerism of the skin, Mongolian spots, hair whorls, the ontogeny and phylogeny of the hair.

He concludes from the evidence, experimental and otherwise, that the melanin is formed *in situ* in the epidermis. The writer does not believe that the evidence is so conclusive on this point as Pinkus represents.

Perhaps the most elaborate and complete article in the book is the one by Bardeen on the development of the skeleton and connective tissues, occupying some 160 pages. It includes a discussion of the histogenesis of the connective tissues, and morphogenesis of the skeletal system including variations and abnormalities in skeletal development. He divides for consideration the development of the cartilage bones into three stages, the blastemal, chondrogenous and osteogenous. This discussion is based largely on his own work and that of Lewis already published. He opposes Rosenberg's theory of the cephalic shifting of the ilium during ontogeny.

The article by W. H. Lewis on the development of the muscular system is an excellent discussion of the subject and is based largely on his own work. The subjects included are the histogenesis of muscle, the segmentation of the mesoderm and the development of muscles in groups and individually. Contrary to the usual view of anatomists he finds no cephalic myotomes but derives the orbital muscles from a mass of mesoderm on the dorsal side of the optic stalk. Also, he fails to find occipital myotomes but believes that the tongue musculature develops from the mesoderm of the floor of the mouth. Futamura's description of the genesis of the face muscles is followed, deriving them from the hyoid arch.

The illustrations in this volume are numerous, but in some cases they are not so good as such an excellent text deserves. A considerable bibliography is appended to the sub-divisions of each article. No index is furnished.

This country is certainly to be congratulated on the excellent showing made by its anatomists, and Mall in particular is to be felicitated on the excellence of the volume. Anatomy in America is greatly indebted to the work, influence and high ideals of Mall. The second volume will be awaited with great interest.

The Medical Annual. A Year Book of Treatment and Practitioners' Index. Twenty-ninth Year. Price 9/6. (*Bristol: John Wright & Sons, Ltd. New York: E. B. Treat & Co., 1911.*)

This is one of the best books in English covering the progress made in all branches of medicine during the past year. The articles are carefully prepared by physicians thoroughly acquainted with the subjects discussed by them. The majority of the contributors are English, but in the list are also the names of two Americans, one Canadian, two Germans, and a Frenchman. The work is supplied with an excellent table of contents, and many good illustrations. It contains also a valuable addition in a list of the principal medical works, and new editions published during 1910, and another of asylums and a trade directory which makes it of especial use to English practitioners; but for other practitioners as well it is an excellent annual.

Puerperal Infection. By Arnold W. W. Lea, M. D., F. R. C. S., Lecturer in Obstetrics and Gynæcology, The University, Manchester, England, etc. Price $9. (*London: Henry Frowde and Hodder & Stoughton, 1910.*) *Oxford Medical Publications.*

For a long time German monographs upon practical medical subjects have been available, but similar compilations are only beginning to appear in English. There is particular good fortune in having such an excellent one, as is here given, upon puerperal infection, for this is by far the most important complication with which the obstetrician meets.

The author quotes statistics from the British Registrar General's office, which indicate "that one-half of all the deaths of women occurring in connection with child-birth are referable to infection, while its remote results are a source of ill-health to a much larger number." We are shown that there has been only a slight diminution in the mortality from this disease during the past 40 years, and that in some parts of the United Kingdom there is even a tendency toward an increase. The total puerperal death rate was 5.9 per 1000 from 1851 to 1855; it still amounted to 4.2 per thousand between 1901 and 1906. In England and Wales alone from 3000 to 5000 women die annually from this largely preventable complication. Statistics further indicate that the incidence of infection is very much greater in country districts than in the cities where fairly good conditions would seem to prevail. However, the author regards the whole situation as a grave reproach to our times, and in the prevailing conditions he has found sufficient stimulus to prepare this volume of nearly 400 pages.

The monograph views the subject from every side, and in exhaustiveness compares favorably with the article by Von Herff in Von Winckel's Handbuch. It must prove helpful to those who teach obstetrics, but will perhaps have an even greater value for the practitioner. Fully two-thirds of the book is devoted to clinical matters, and one-half of this section deals altogether with treatment. As might be expected, means of prevention are emphasized as the most important feature in combatting infection, but curative measures are discussed at great length and their relative values carefully weighed. The recommendations made are unusually trustworthy. In the discussion of therapeutic measures about which there is some diversity of opinion, the evidence of different advocates is impartially given, yet the author always frankly commits himself to one view; herein he displays clear reasoning and reaches sound conclusions.

The same judicial qualities are apparent in the first portion of the volume which deals with the bacteriological and pathological phases of puerperal infection. The more recent contributions along these lines have been incorporated, and in many instances first hand information relative to disputed points is given. Thus, from his own investigations the author believes that streptococci may occasionally be found in the vagina during pregnancy. He has also observed that such organisms may possess hæmolytic properties.

The pathology is discussed at length, and the suggestions it affords as to treatment are indicated. The author agrees with those who find in the reaction of the endometrium a very good argument against curetting an infected uterus, for this operation usually does no more than remove nature's defense against the disease.

The one criticism which may be fairly offered pertains to the pathological illustrations: these do not reach the standard justified by the text. The book is a valuable addition to the literature of infection, and will be welcome to those who are practising obstetrics.

Urgent Surgery. By **Félix Lejars.** Professeur Agrégé à la Faculté de Médicine de Paris, etc. Translated from the sixth French edition by **William S. Dickie**, F. R. C. S., etc. Volume II. Illustrated. (*New York: William Wood & Company, 1910.*)

The second volume of this work is divided into four sections, dealing respectively with the genito-urinary organs, the rectum and anus, the strangulated herniæ, and the extremities. Of the first two of these sections it is perhaps sufficient comment to say that they exemplify the excellent characteristics of the work as a whole. That is, the subject is handled concisely and clearly, yet with no tendency to a restriction to simple generalities, as many quite unusual conditions are discussed and typified by case-reports. Logical subdivision of the subject matter into topics and paragraphs, with typographical arrangements to emphasize headings and important conclusions, aids greatly in dispelling the inevitably forbidding effect of page after page of unvarying print, and renders quick consultation of the book easy. The work is further distinguished from the usual uninspired recitation of commonplaces by the numerous ingenious bits of technique and the wealth of striking clinical observations, which give so strong a note of the writer's personalty and add so much to its practical value.

The part of the book devoted to the urgent surgery of hernia demands more consideration than the above remarks, which are true of the work as a whole. This section really constitutes a monograph of authority, and a masterly treatment of emergency hernial surgery. It is the most comprehensive and rational handling of this highly important phase familiar to the reviewer. The unusual types of strangulation are ably discussed, and a perusal of this book makes one feel far less likely to overlook or mistreat some of these quite obscure cases. The last part of the book, dealing with the extremities, is likewise eminently rational and practical. The various subjects are presented with an attitude of healthy conservatism, of the sort that is not deterred from recourse to seemingly radical measures when such measures are in fact truly conservative.

There are certain points that strike one as noteworthy for the shade of difference presented from the familiar American viewpoint. One misses any reference to the so-called Mayo closure of umbilical herniae in a transverse direction. There is a decided fondness displayed for more or less complicated apparatus in the treatment of fractures. The author categorically condemns the use of gauze in packing abscess cavities, using rubber tubes exclusively. A number of conditions are included that many would give no place to in a work on urgent surgery, such for instance as the open treatment of certain fractures. This, however, is purely a matter of degree, since most surgery, excepting plastic and other types of work where an optimum period is awaited, is urgent in the sense that the sooner it is done the better, even when there is no imperative need of haste.

The book is properly and most admirably illustrated, most of the cuts being original. The translator deserves high appreciation for a rendition into English so pure and idiomatic that no flavor of the original French of the text is perceptible.

Harvey B. Stone.

A Text-Book of Surgical Anatomy. By **William Francis Campbell**, M. D., Professor of Anatomy at the Long Island College Hospital. Second edition revised. Illustrated. Price, $5.00 net. (*Philadelphia and London: W. B. Saunders Company, 1911.*)

In the preface to this edition the author states "that only such additions have been made and errors corrected as to make the text more complete and exact. Several illustrations have been replaced by others which more accurately elucidate the text." The merits of this work were noted by us (Johns Hopkins Hosp. Bull. Feb., 1909), and its success, as shown in the call for a new edition so soon, is a natural consequence of its qualities which make it valuable to students.

The Johns Hopkins Hospital Bulletins are issued monthly. They are printed by the LORD BALTIMORE PRESS, Baltimore. Subscriptions, $2.00 a year (foreign postage, 50 cents), may be addressed to the publishers, THE JOHNS HOPKINS PRESS, BALTIMORE; single copies will be sent by mail for twenty-five cents each. Single copies may also be procured from the BALTIMORE NEWS CO., Baltimore.

BULLETIN

OF

HE JOHNS HOPKINS HOSPITAL

Entered as Second-Class Matter at the Baltimore, Maryland, Postoffice.

XXII.—No. 245.] BALTIMORE, JULY, 1911. [Price, 50 Cents

Jl 25 1911
RECEIVED

CONTENTS.

PAGE

ereoscopic X-Ray Examination of the Chest with Especial eference to the Diagnosis of Pulmonary Tuberculosis. (Illustated.)
By H. Kennon Dunham, M. D., Walter W. Boardman, M. D., and Samuel Wolman, M. D.
Discussion by F. H. Baetjer, M. D., Louis V. Hamman, M. D., and W. S. Thayer, M. D. 229

ysmal Hemoglobinuria; Blood Studies in Three Cases.
By W. L. Moss, M. D. 238

lcification of the Costal Cartilages, the Cardio-Thoracic Index d Other Signs of Pulmonary Tuberculosis.
By W. W. Boardman, M. D., and H. Kennon Dunham, M. D. 247

PAGE

Experimental Studies on Tuberculo-Protein Hypersensitiveness and Their Possible Applications.
By Allen K. Krause, M. D. 250

Variations in the Leucocyte Count in Normal Rabbits, in Rabbits Following the Injection of Normal Horse Serum, and During a Cutaneous Anaphylactic Reaction. (Illustrated.)
By W. L. Moss, M. D., and G. L. Brown, M. D. . . 258

The Use of Antiformin in the Examination of Sputum for the Tubercle Bacillus.
By W. W. Boardman, M. D. 269

Serum Treatment of Hemorrhagic Diseases.
By W. L. Moss, M. D., and J. Gelien, M. D. . . . 272

Concerning the Much-Holzmann Reaction.
By W. L. Moss, M. D., and F. M. Barnes, Jr., M. D. . 278

HE STEREOSCOPIC X-RAY EXAMINATION OF THE CHEST WITH ESPECIAL REFERENCE TO THE DIAGNOSIS OF PULMONARY TUBERCULOSIS.

BY

H. Kennon Dunham, M. D., Cincinnati,

Walter W. Boardman, M. D.,

Assistant Physician, The Phipps Tuberculosis Dispensary, The Johns Hopkins Hospital,

and

Samuel Wolman, M. D.,

Instructor in Medicine, The Johns Hopkins University.

DISCUSSION BY

F. H. Baetjer, M. D., Louis V. Hamman, M. D., and W. S. Thayer, M. D.

PART I.

By H. Kennon Dunham, M. D.

object of this paper is to call attention to the principles chnique of stereoscopic X-ray examinations, and to e the alterations in the normal chest shadows, which ieve to be characteristic of pulmonary tuberculosis.

X-ray, when properly applied, is an instrument of preor recording differences of density. On the single e we have of necessity various shadows superimposed. o-rœntgenographs taken with mathematical precision the chest is seen in true perspective, the shadows occupying the same relative position in the image, as the structures which cast the shadows occupy in the chest. This result is obtained by applying the principles of binocular vision. As you will recall "the retinal images of external objects, particularly near objects, are different in the two eyes. Whenever what we may call a right-eyed image of an object is thrown on the right eye and simultaneously, a left-eyed image is thrown on the left eye, whether in nature or by an artifice, we at once perceive depth or solidity in the object." The technical problem then, in stereo-rœntgenography was, first to obtain two negatives corresponding to the right-eyed and to the left-eyed image respectively, and second, to view simultaneously, by means of some suitable optical device, the right-eyed image with the right eye and the left-eyed image with the left eye.

There are at present several types of apparatus which enable us to obtain the necessary negatives. The common principles in these are, first, a movable carrier for the X-ray tube, and second, a movable carrier for the X-ray plates.

In the movement of the tube there are four details requiring consideration. First, recalling that the X-rays originate at the so-called target of the tube, this target should be moved in a plane parallel to the X-ray plate, in order that the focal distance may be equal in both exposures. Second, between the first and second exposures the target should be moved a distance slightly less than the inter-pupillary distance. Six centimeters has been found satisfactory. Thus every one who has good use of both eyes can see the stereo picture and persons with a greater pupillary distance can estimate, by means of their personal equation, the amount of fore-shortening and allow for it. Third, the target should be moved in a line parallel to rather than across the spine of the patient because this enables us to see around the ribs, thereby obtaining a less obstructed view of the lung fields. Fourth, the target should not be too near the plate. Twenty-five inches is a good working average.

As to the movement of the plates it is merely necessary that the second plate on exposure occupy the position held by the first plate during its exposure. Finally, the total time required for the two exposures, and the movement of tube and plates must not exceed a period of easily sustained inspiration, a time well under ten seconds. For observing the finished plates, the stereoscope devised by Whetstone early in the last century, is most generally used.

Turning now to a study of the shadow pictures seen in stereo-rœntgenographs of human chests, let us first consider the normal before attempting to describe the tuberculous.

On examining a stereo-rœntgenograph of a normal thorax, one sees the shadow picture of the bony framework, with its covering of soft parts, enclosing the chest cavity, except below, where it is bounded by the shadow of the diaphragm. The shadows within the chest cavity, seen as we have stated, in their normal relations, are readily divided into three main groups: first, the "heavy central shadow," extending irregularly from the upper boundary of the chest cavity to the diaphragm; second, the "hilus shadow," radiating irregularly to a distance of four or five centimeters on either side of the fifth, sixth and seventh dorsal vertebræ; and third, the "linear markings" seen in the lung fields.

The "heavy central shadow" need not here be described in detail. It is cast by the vertebræ and the mediastinal contents; the heart, aorta and other large vessels, trachea, oesophagus, lymphatics and connective tissue. The trachea can usually be distinguished as a band of less density bordered by parallel bands of great density, extending downward from the neck. Often it can be seen to divide in front of the fifth dorsal vertebra, the shadow of one bronchus going to the ri and the other to the left hilus. The right is the more seen as the left passes under the aortic arch and is genera obscured for some distance. In good plates, these bronch shadows may be seen to subdivide and extend into the fields, as a part of the heavy trunks, to be described directly.

The hilus shadow, as has been stated, is cast by the primar branches of the pulmonary vessels with their contained the walls of the primary bronchi, and the lymphatic fibrous tissue surrounding these structures. Normally, hilus shadow is of moderate density, irregular in outline of small extent, merging internally with the heavy cen shadow. Externally the hilus has a sharp border which made irregular by the heavy trunks emerging from it into lung fields.

The shadows in the lung fields may be subdivided into groups; the heavy trunks and the fine linear markings: heavy trunks appear as definite shadows radiating from hilus shadow toward the periphery. Three groups can usua be seen on the right side, one group running upward and ward, another outward and the third downward and outw These groups mark what we call divisions. They corresp roughly to the lobes of the lung. On the left side only such groups can be seen, one extending upward and outwar the other downward and outward. Distally these heavy tru divide and subdivide producing the radiating shadows nated as the fine linear markings. Examined more careful these fine radiating shadows appear as fairly definite straig lines extending toward the periphery, but with our techni they are lost on the normal plate before they reach the perip ery of the lung. These shadows are the combined shadow cast by the blood vessels with their contained blood, the of the bronchi, reinforced by the accompanying lymphat and fibrous tissue. The heavy trunks are the shadows of large branches distributed to separate lobes of the lung. linear markings are the shadows cast by the smaller branc distributed to the various lobules of the separate lobes. linear markings in the lower left division of the lung rarely distinct, owing to movement, during exposure, sioned by the cardiac contractions. Therefore alterations the character of the markings in this region cannot be acc rately determined.

Bearing in mind, then, this normal shadow picture, let consider the stereo-rœntgenographs of chests in which ear but definite signs of pulmonary tuberculosis are found physical examination. In such cases changes are noted in hilus shadow, the heavy trunks and especially in the linear markings.

The hilus shadow shows usually an irregular increase area and density with here and there small irregular shadows of very marked density. These bright areas of great density ar due to the presence in the chest of calcified caseous or fibro glands, while the increased area and density of the hil shadow is due to a general increase in the fibrous and lymphati tissue which accompanies a local or general mediastini- Such changes alone are of very slight diagnostic value as y or tuberculous origin, indicate an old pro- more or less healed. In fact the presence of calcified ds, the other conditions being favorable, may be taken as od prognostic sign.

he heavy trunks extending toward the involved area lly appear broader, denser and less regular in outline in the normal. Here again this change in the heavy ks is not necessarily tuberculous in origin, so that too t importance must not be attached to this change alone.

ccompanying this alteration in the heavy trunks we find ie diseased area a similar change affecting the fine linear kings. They appear broader, denser and less regular in ine, frequently their course is studded, sometimes almost bliteration of the lines. We can no longer trace them as ating but find them broken in continuity and reaching to ear the periphery. As a result of these changes the linear kings appear to cross and interweave, producing a delicate ork of varying sized mesh. In the uninvolved areas of lung the shadow picture may be normal or there may be a it alteration, such as thickening or increased density of the ks and linear markings. The anatomical explanation of altered shadow picture we are not at this time ready to iss, but we firmly believe that the increase in the hilus ow, the thickening of the trunks, together with the altera- s in the linear markings—increase in density and breadth, ding, interweaving and extension to the periphery—con- ite a shadow picture characteristic of early pulmonary rculosis. As the lesion progresses the alterations become e marked, the linear markings are more and more broken nd irregular, the studdings become larger and denser and interweaving closer, until eventually the whole area ap- s as a more or less homogenous shadow of increased den- due to the presence of gross areas of consolidation within lung. The more advanced change due to cavity forma- we need not discuss at this time.

e have now considered the appearance of the stereo-rœnt- graph of the normal chest and of the typically early tuber- s chest. However, all cases do not fall into these two s. In the clinical report by Dr. Wolman the cases were ed into five groups: (1) Normal; (2) Diseased but not rculosis; (3) Probably Tuberculosis; (4) Definitely rculosis; (5) Healed Tuberculosis. It must be clearly stood that the stereo-rœntgenographic examination does raw a sharp line of differentiation between these various s any more than does the clinical examination. In ng the border line cases the personal attitude and ex- ce of the examiner is of great importance. We cannot, ore, set forth any absolute rules to be applied in the cation of every case, but a brief description of the pictures which we consider typical of the various may be of some assistance.

normal picture has already been discussed. It might tioned that with advancing age there is an increase in sity of all the shadows, hilus, heavy trunks, and linear gs, for which due allowance must be made.

at this time discuss the stereo-rœntgenographic appearance of acute pneumonia, abscess, gangrene, cyst, etc., except to say that they should cause no diagnostic difficulty. There is, however, a large class of cases presenting indefinite clinical signs suggesting pulmonary tuberculosis, which upon examination disclose an interesting and sometimes puzzling appearance. The hilus shadow and heavy trunks are increased in area and density, but sharply defined, radiate, often reaching close to the periphery. These changes are usually diffuse rather than localized and there is also an absence of the interweaving and studding characteristic of the tuberculous cases.

In the probably tuberculous cases some of the characteristic alterations are seen but the picture is not complete. There may be the changes in the shadows cast by the hilus and heavy trunks and suggestive alterations in the linear markings, or some other atypical alteration. These are the cases that require the most careful study and judgment in reaching a diagnosis. The history, symptoms and physical examinations are essential in these cases.

The moderately advanced and advanced cases of pulmonary tuberculosis are readily recognized. In the less advanced cases, careful study will disclose the alterations in the linear markings, heavy trunks and hilus shadow previously described. If in such cases the fine linear markings are fuzzy, or seem to merge to form a cloud effect, such as a film of tobacco smoke in a close room, an active tuberculosis would be suggested.

On the other hand if the linear markings in a limited area are sharply defined and dense and show heavy studdings beyond the trunks, a healed lesion is suggested. This condition is emphasized if it is accompanied with heavy coarse interweavings which reach to or near the periphery. The heavy trunk leading to such an area is usually broad and dense as is the hilus on the same side. Numerous calcified areas would complete the picture, but such a diagnosis should not be made from the plates alone.

One other change which is almost constant in pulmonary tuberculosis, but which is less often diagnosed, either clinically or radiographically, is pleurisy. Marked localized thickenings and interlobular pleurisies are recognizable, but the evenly distributed pleurisy which spreads uniformly over one or both pleural surfaces usually defies detection. On the other hand, pleurisy with effusion, even of moderate magnitude, is readily detected and presents a most interesting appearance in the stereo-rœntgenograph. The fluid is seen to be pressed up around the periphery of the chest cavity. The line of contact between the shadow of the fluid and the shadow of the lung is not, however, a smooth rounded surface, but rather a series of cup-like depressions. Apparently the pressure of the lung upon the fluid is not uniform, there being bands between which the pressure upon the fluid is greater than at the bands. Emerson has compared the position of the pleural effusion pressed upon by the lung with the position of water in a bottle pressed upon by an inflated rubber bag. The simile would be more exact if the rubber bag were covered by a balloon net. Regarding the oft repeated statement that in pleurisy with effusion the upper border of the fluid moves on change of position of the patient; the X-ray shows but slight if any change in the fluid level whether the patient be in the erect or recumbent position.

The report of Dr. Wolman clearly illustrates the value of this method of studying pulmonary lesions. So far as we know, this is the first report of any careful stereo-rœntgenographic study of the alterations in the fine linear markings occurring in pulmonary disease and the application of this knowledge to the diagnosis of pulmonary tuberculosis. We hope in the near future to be able to explain on anatomical grounds the alterations in the appearance of the linear markings. However, although the method is still empirical and controlled only by careful clinical examinations, we are firmly convinced of its great worth and feel that its more general adoption would greatly increase the value and accuracy of the radiographic diagnosis of pulmonary conditions.

PART II.

By Walter W. Boardman, M. D., and Kennon Dunham, M. D.

There is considerable diversity of opinion as to the value of Rœntgen rays as an aid in the diagnosis of early pulmonary tuberculosis, some authorities placing them above ordinary physical examination, others on a par with physical examination and still others denying to them any such position. To investigate this matter it was decided to install an X-ray apparatus in the laboratory of the Phipps Dispensary and to study an extensive series of cases, controlled by careful clinical examination, tuberculin tests, etc.

In reading an X-ray plate, as in the study of a pathological specimen, it is first necessary to become familiar with the normal before trying to interpret the abnormal. Further, as in studying a pathological specimen it is important to know the structure and arrangement of the various units, so in an X-ray plate it is important to know the anatomical basis for the shadows seen. We therefore turned our attention to a consideration of this subject.

Remembering that in an X-ray plate we have merely a record of differences of density,—the tissues of greater density appearing as light areas, those of less density as dark areas,—we know that the shadows seen correspond to structures in the chest possessing greater density than the structures immediately surrounding them. On the single plate we have of necessity various shadows superimposed one upon the other. In stereoscopic plates, however, the chest is seen in perspective, the shadows occupying the same relative position in the image as the structures which cast these shadows occupy in the chest. The advantage of the stereo-rœntgenogram for the careful study of the various shadows must therefore be self-evident.

Turning then to a consideration of a stereo-rœntgenogram of a normal chest we see the shadow picture of the bony framework, with its covering of soft parts enclosing the chest except inferiorly, where the shadow of the diaphragm is seen. The shadows within the chest cavity seen, as we have stated, in their normal relations, may readily be divided into three main groups: first, the heavy central shadow extending from the upper boundary of the chest cavity to the diaphragm; next the hilus shadows, radiating irregularly to a distance of four or five centimeters on either side of the center of the preceding shadow, and finally the finer markings seen in the lung fields.

Owing to imperfections of apparatus, the hilus shadows and the finer markings were rarely, if ever, seen upon the plates of the earlier workers and it was not until 1900 that they attracted any serious consideration. Thus Hickey[1] states that we find various shadows constantly present which are interpreted as shadows of the bronchi by some, shadows of the pleura by others, and shadows of consolidation by still others. However, he believed them to be perfectly normal, and basing his opinion on various injections, concluded that they were the shadows of the larger pulmonary vesels.

Holzknecht[2] believed that the hilus shadows were due to pulmonary blood vessels; but to the smaller vessels situated near the surface of the chest next the plate, rather than to the large centrally situated vessels.

De la Camp[3] disproved Holzknecht's contention by X-raying serial frontal sections of a cadaver. By this means he definitely proved that the hilus shadows were due to organs which originate at the root of the lung and branch out toward the periphery and are not due to formations near the plate. From various injection experiments he also concluded that the bronchi were responsible for these shadows and that the vessels took practically no part in them.

Holzknecht and Kienböck[4] rejected the conclusions of De la Camp and stated that they believed the pulmonary vessels were primarily responsible for the shadows and that the bronchi participated in them to but a slight extent.

De la Camp,[5] after further careful experimental work acknowledged that the blood vessels might cast some shadows but held that they were secondary in importance to the bronchi as a source of the hilus shadows.

Cowl[6] very definitely states that the shadows normally present in the fields of the lungs are due to the ray-like spreading lung vessels and bronchi, but he brings forth no proof of his statement.

Rieder[7] speaks of the irregular spotted markings seen in the lung fields and states that they are caused more by the pulmonary vessels, especially the arteries, than by the bronchi. Later he states that the anatomical nature of the shadow stripes and hilus shadows has not yet been determined, but that most investigators believe both bronchi and blood vessels play a part in the production of these shadows.

Cunnington[8] describes a "tree branch striation" which he noted in only a few of his tuberculous cases and which he believes is due to the distended lymphatics draining the involved areas.

Many others have expressed opinions regarding the anatomical basis of these shadows, but have made no attempt to prove their statements. As Rieder has said, the most generally accepted opinion regarding these shadows is that the careful experimental work, conclude that "the anatomical sub-stratum of the hilus shadow consists entirely of the blood vessels of the lungs and that under normal conditions the bronchial arborization gives no shadow on the Röntgen plate. It is, however, quite possible that in abnormal conditions, dilated bronchus filled with pus, it may give a shadow."

From the foregoing references to the literature it is evident that the question as to the anatomical basis for many of the shadows seen in X-ray plates of the chest had not been settled. In our investigations upon this question the work falls into four divisions: first, studies of stereoscopic X-ray plates of normal and diseased chests before death; second, studies of stereoscopic plates taken shortly after death, the X-ray reading being carefully compared with the autopsy findings; third, studies of stereoscopic X-ray plates of animal and human beings in which blood vessels and bronchi had been injected with bismuth or other similar materials; and fourth, studies of stereoscopic X-ray plates of the lungs of animals and human beings upon which more or less dissection had been done. The use of the stereoscope and the dissection were of greatest value.

From our study of the stereoscopic X-rays of normal and diseased chests, several points were settled. First, the hilus shadow is due to structures originating at the root of the lung and radiating toward the periphery, as demonstrated by De la Camp, since with the stereoscope these shadows were seen in their normal relations to the other structures in the chest. Second we were able to divide these radiating shadows in the hilus region and also in the lung fields into groups corresponding to the anatomical division of the lung into obes; three on the right, two on the left. These subdivisions were very beautifully seen in the stereoscopic plates of injected ungs.

The shadow cast by the heart, with its surrounding periardium and by the aorta, is too well known to require comment. The tracheal shadow, in many plates, could be defiitely traced from the larynx into the hilus shadow as a band f slight density lying between parallel bands of great ensity; in several cases the divisions and subdivisions could be learly traced well out into the lung fields. Aneurisms and ilatations of the arch of the aorta were readily recognized and heir location determined.

From our autopsy work we satisfied ourselves that enlarged nd calcified lymph glands may be easily recognized if occurng about the edge of or outside the heavy central shadow; if ey occur within the heavy central shadow it may be imposble to pick them out. Without doubt the heavy central adow is cast by structures in the mediastinum; the heart ith its pericardium and great vessels, the oesophagus, the alls of the trachea, the lymphatic glands and the mediastinal nnective tissue. But it is difficult or impossible to recogze the shadows corresponding to some of these different ructures.

One of our autopsy experiments gave interesting information … vertebral shadow and extending from the clavicle to the base of the heart. This shadow must be cast by structures on the right side of the superior mediastinum. Here we have the superior vena cava surounded by lymphatics and mediastinal tissue. In order to demonstrate what part, if any, this vessel played in the production of this shadow, a body was placed upon the table and a set of plates taken. The right internal jugular vein was then opened and a rubber tube filled with lead shot passed some distance into it and a second set of plates taken. In these the shadow of the tube and shot can be seen extending from the neck through the shadow under consideration and into the heart shadow. At autopsy the tube was found to have traversed the right internal jugular, the right innominate, the superior vena cava, the right auricle and to have entered the inferior vena cava. We therefore feel justified in stating that the superior vena cava, with its contained blood, is at least in part responsible for the shadow seen; the lymphatics and fibrous tissue, however, must play some part in its production.

The results obtained from our injection experiments of animal and human lungs were disappointing. Plates taken after injecting bismuth into the trachea and bronchi showed shadows apparently corresponding in position and size to the shadows normally seen at the hilum and in the lung fields. However, plates taken after similarly injecting the blood vessels disclosed shadows also apparently corresponding in position and size to the normal shadows. If both bronchi and blood vessels were injected the shadows appearing on the plates were too dense to allow of careful study. Hence as a means of settling the disputed question this method was valueless, as might have been inferred by the widely different conclusions reached by the earlier investigators using the method.

Our dissection work on animal lungs was more satisfactory, especially the series in which pigs' lungs were used. These gave very beautiful pictures showing the bronchi as areas of decreased density. Partial injections of pigs' lungs showed the artery to be directly in contact with one side of the bronchus, the vein in contact with the other side. An instructive experiment consisted in carefully separating the lobules from over a bronchus, which was exposed throughout its course from hilum to periphery. A section of the bronchus was now removed and placed on another portion of the lung. The plates taken showed first a definite shadow cast by the removed bronchus; second, definite shadows cast by the artery and the vein in the space from which the bronchus had been removed. These latter shadows were less dense than the shadows with which they were continuous above and below. In other words, the arteries and veins cast shadows in X-ray plates of pigs' lungs, but normally their shadows are augmented by the shadow of the bronchus. Thus the veins, the arteries and the walls of the bronchi cast shadows of great density in the pigs' lungs; the lumen of the bronchi appears as a shadow of slight density. It now became important to repeat this experiment on a human lung.

To this end a normal human lung was obtained as soon after death as possible, inflated to its natural degree and the first set of plates taken. In these, lines of increased density were readily seen, radiating from the root of the lung toward the periphery. The lung tissue in the region corresponding to one of the more definite lines was carefully separated until a vessel was exposed throughout its course. In the second set of plates the shadow cast by the exposed vessel, a vein, was seen to correspond in position to the shadow on the first plate. The vein was now carefully removed and placed across another portion of the lung, and a third set of plates taken. In these a definite shadow was cast by the removed vein and a shadow was still present in the original position but of lessened density. Beneath the vein lay the artery and this was now removed and placed parallel to the vein, and the course of the bronchus which was now exposed was mapped out with two pins. In the fourth set of plates the bronchial shadow was distinct, although faint, running between the pins, and a definite shadow was present corresponding to the removed artery. The bronchus was now removed and placed parallel to the vein and artery. The plates now showed an absence of any shadow in the original location and definite shadows cast by the vein, artery and bronchus. The proximal end of the bronchus in which cartilage was present cast a very marked shadow. A section of the primary bronchus and of the large thick walled pulmonary artery was now placed side by side on another portion of the lung, and X-ray plates were made. The plates showed a very definite shadow cast by the primary bronchus and a much less marked shadow cast by the walls of the pulmonary artery. Finally two other vessels were exposed and by means of syringes blood, to which a small amount of sodium citrate had been added to prevent coagulation, was injected directly into them. The plates of this last experiment showed slight but definite increase in the density of the shadow beyond the tip of the syringe needles, the site of the injected blood.

We believe that we have proved in this experiment beyond the question of a doubt that the walls of the arteries, the walls of the veins and the walls of the bronchi cast shadows in X-ray plates of normal lungs removed from the body and that these structures bound together as they are by a small amount of fibrous tisue and surrounded by the lymphatics, are collectively responsible for the shadows seen in the parenchyma of the lungs. Furthermore, that the blood normally contained in the pulmonary vessels increases to some degree the density of the shadow cast, and finally, that the walls of the large bronchi are capable of casting very definite shadows which normally are heavier than the shadows cast by the walls of the large vessels. However, the large vessels, with their contained blood, cast a homogenous shadow, whereas the bronchi, with their contained air, cast a very different shadow, consisting of two parallel bands of great density separated by an area of slight density.

We therefore believe that the anatomical basis of the shadows seen in the lung fields and at the hilum in X-ray plates of normal chests is definitely settled. The hilus shadow is caused by the primary branches of the pulmonary vessels with their contained blood and by the walls of the primary branches of the bronchi, together with the lymphatic glands and fibrous tissue which accompany these structures and bind them together. Remembering that the large blood vessels cast a uniform shadow, the blood vessels probably account for a greater part of the hilus shadow than do the two parallel shadows cast by the branches of the bronchi; however, this bronchial shadow is a very definite part of the general whole. The shadows seen in the lung fields are also due to the blood vessels with their contained blood and to the walls of the bronchi. The surrounding fibrous and lymphatic tissue is normally so slight that it probably plays little part in the production of these shadows. Here again the blood vessels, with their contained blood, must cast more shadow than do the walls of the smaller bronchi with their contained air, but it is evident that this bronchial shadow cannot be neglected as a factor in the production of the finer markings in the lung fields.

LITERATURE.

1. Hickey: Journal of the Michigan State Medical Society, 1904, III, 2.
2. Holzknecht: Die röntgenologische Diagnostik der Erkrankungen der Brusteingeweide, 1901, 45.
3. De la Camp: Physikalische medizinische Monatschrift, 1904-05, I, 223.
4. Holzknecht & Kienböck: *Ibid*, 305.
5. De la Camp, *Ibid*, 310.
6. Cowl: Lehrbuch der klinischen Untersuchungsmethoden von Eulenburg, 1904, I, 506. Kolle, Weintraud, Berlin.
7. Rieder: Verhandlungen der deutschen Röntgengesellschaft 1907-08, III-IV, 25.
8. Cunnington: Practitioner, London, 1908, 86.
9. Fraenkel & Lorey: Archives of Röntgen Ray, 1910, No. 115.

PART III.

By Samuel Wolman, M. D.

The purpose of this paper will be better accomplished if I confess to you that in the first few days of the work, I conceived a profound distrust of diagnoses that had to be based on Dr. Dunham's peculiar stereoscopic markings. But now I can testify to my conversion to a belief in these same scorned markings. The original distrust was as natural as the consequent conversion, for the markings and interweavings declared to be pathognomonic of tuberculous changes in the lung tissue had no assignable anatomical or even clinical basis. We had all read of tubercles large and small, of caseated areas, of foci of softening, of thickening and congestion around all such areas, even of gross tuberculous fibrosis, yet nothing of all this was competent to explain why, for example, in the presence of a small tuberculous focus at an apex, a peculiar characteristic, recognizable, and yet delicate tracery should develop throughout a large surrounding area, and extend to the very periphery of the organ; and the more advanced the lesion the more extensive, the grosser this tracery. These markings being unexplained, mysterious, not attachable to our existing system of knowledge, had then for us no meaning. Nor even now do we know of any acceptable explanation. However, after sub-

The clinical notes of all the cases reported in this paper, were made before the radiographs were taken. The radiographic study and diagnosis, on the other hand, were made without any knowledge of the history or clinical findings. Needless to say, the appearance of the patients themselves was not such that snap-shot diagnoses could be made by the radiographer, for we did not send Dr. Dunham emaciated and buxom patients alternately for examination. Indeed, in order to make the test severe, we sent comparatively few advanced cases, since the plates of these showed gross markings, such as are easily seen on single plates, and it was the stereographic markings that we were most curious to study. And then too, our study of the advanced cases soon convinced us that our clinical technique could be safely subjected to a more searching criticism, for there was an extremely gratifying coincidence of the physical and radiographic findings. And here it may be well to emphasize that the stereographic plates show not less, but more, than the single plate readings, so that not only were we testing the radiograph, but the radiograph, in turn, was testing the clinical work.

In recording the clinical findings, our aim was first to note every abnormality of the physical signs; secondly, on the basis of history, symptoms, sputum examination, tuberculin tests, and physical signs, to decide whether these signs should be attributed to tuberculosis or not. The radiographer, in his turn, noted all abnormal markings in the lungs, and would then commit himself in writing as to their etiology.

This series embraces 92 cases, and in only seven of the 92 was there a disagreement between the clinical and the X-ray findings. However, in six of these seven, the disagreement was only partial and comparatively slight, so that in only one f the 92 cases was there a definite clash.

Let us first study the six instances of only partial agreement:

Case I.—Clinically, impairment at right apex. The stereoscope hows impairment at both apices, but much more marked at the ght. Both clinical and X-ray diagnoses are: not definitely tuberculous.

Case II.—Age 5. Clinically, transient râles in the upper chest n each side, which we were not willing to diagnose as tubercu-us. The X-ray suggests tuberculosis in both upper lobes. The per cent tuberculin eye test was positive.

Case III.—A girl of 16 with mild mitral insufficiency. Clinic-y, fibrous changes in right upper and lower lobes, with a finite consolidation at the left base. This girl had but few mptoms, except some weakness, and a moderate cough. She s examined by Dr. W. S. Thayer. The question arose as to ether the insufficiency could explain the lung signs. The X-ray owed the changes discovered in the right chest to be of a tuber-ous nature. The consolidation at the left base was not shown, ; Dr. Dunham admits difficulty in reading the left base, ecially where the heart is enlarged.

Case IV.—Clinically diagnosed as tuberculous at the right apex. e X-ray diagnoses lesions at both apices, but more marked on right side.

crackles. The X-ray agrees as to the right lung, but shows also a large lesion in the left. (This may have been concealed, however, by the compensatory emphysema noted clinically).

Case VI.—Colored woman. Wasserman test +, eye test ++ (5 per cent). Clinically, only an impaired note over both upper lobes, which we were chary of diagnosing as tuberculous on account of the lues. X-ray diagnosis, tuberculosis in both upper lobes.

Case VII.—The one of disagreement—concerns a child of three years. The skin-test was positive; otherwise the examination was clinically negative, but the X-ray showed a small lesion in the left lung.

These seven cases comprise our entire list of differences, and we feel that neither the clinician nor the radiographer emerges badly wounded. Hereafter our talk is of harmony, and as follows.

The next group is of 38 cases, in which, clinically, the diagnosis of pulmonary tuberculosis was made definitely. Twelve of these are far advanced cases, and in 16 tubercle bacilli were found. In all these 38, there was agreement between the clinical findings and the plates, as to the position, grade, and general extent of the lesions. (But it must be said that in every case, the pulmonary disturbance, as judged by the interweaving, is more extensive than the lesion, as judged by clinical means. Even a slight apical lesion appears as a long track from the root). Four of the cases were clinically stated to be fibroid. The same diagnosis was made by the X-ray. However, two cases which had at one time given definite physical signs, and had now been for some time without symptoms, and almost without signs, were reported by the radiographer as tuberculous, without any saving note. And here we must state that the X-ray, even with the stereoscope, does not seem to be able to differentiate active from healed lesions. However, neither do the physical signs.

We then have 24 cases in which definite physical signs were found. For these signs a tuberculous basis was suspected, but could not be definitely affirmed, clinically. In all these 24, the X-ray showed abnormalities corresponding to the physical signs, and in 12 of the 24, a diagnosis of tuberculosis was made. It is extremely interesting to find that in 12 of these cases, that is, in 50 per cent of those marked only probably tuberculous, clinically, the radiographer too, made a diagnosis of probable, rather than positive, tuberculosis. This conservatism on the part of the stereograph, was extremely reassuring to those of us who were timid about relying on the mysterious interweavings. Case VI of this series had a mitral lesion, which made us hesitate in diagnosing tuberculosis. The X-ray said tuberculosis, and the sputum showed tubercle bacilli. However, Case VIII, which the X-ray diagnosed as only probable, we fully believe is tuberculous, on the basis of later signs and symptoms.

Case XIV is one of general bronchitis, with indefinite signs at the apices, but severe constitutional symptoms. Although clinically, we were not ready to diagnose the case as tuberculous, yet we were strongly tempted to do so. However, the

X-ray note made was "borderline case. Suggests thickened bronchi." Later events showed no ground to suspect tuberculosis.

In Case XIX, the clinical diagnosis was, thickened pleura, bilateral. The X-ray note was, "Pleurisy at the apices. Probably an old tuberculous lesion."

In Case XXII, the clinical finding was impairment at both apices, but more on the left. No râles. The X-ray reports both apices involved, but the older lesion on the left.

The next group comprises 14 cases. In these 14, neither the X-ray nor the physical examination noted any abnormalities. It should be remembered that in the entire series of 92, there was only one other case in which the chest was physically negative, and in that case, as already stated, the X-ray showed a lesion. This accord as to absolutely negative findings on both sides of the investigation in 14 out of 15 cases, so reported clinically, is of considerable significance.

The last group comprises eight cases. In these eight, the diagnosis of "not tuberculous" was made by both methods, but in contrast to the preceding group, physical signs were present, and were similarly reported by the radiographer, and by the clinician. It should here be noted that evidently the stereograph does not report all abnormalities in the pulmonary parenchyma as tuberculous. (This indeed appeared also in the group of probable cases, as noted above). Case I of this series had definite tertiary lues elsewhere in the body. Case II was one of bronchial asthma. The X-ray reports signs in all five lobes, but they suggest bronchial trouble, rather than tuberculosis. The patient, at the time the picture was taken, did not give evidence of having secretion in the bronchi. The lungs that day seemed clear. In this case, too, pleural thickening over the right upper lobe was diagnosed by both methods. In Case III, Dr. Dunham refused to make a diagnosis, but said the plate showed what was perhaps a healed lesion. The clinical history, too, suggests an old infection, whatever the etiology.

We wish further to mention two cases. Both were young adults, both in apparently good health, but each had a history of chronic cough and expectoration. Physically, there were signs of severe general bronchitis. However, in each case the râles were more numerous on the right side, and there was moderate impairment over the upper lobe of the right lung. The stereograph diagnosed tuberculosis in both cases, more marked in the right lung. The patients, however, seemed in good health, and we might have been skeptical, had not one of them produced tubercle bacilli in the sputum. And we are inclined to believe the diagnosis in the other case, too, since the signs are more emphasized on one side.

To sum up: In only one of the 92 cases was there an entire disagreement; in only six, a partial disagreement. In 85, there was entire agreement. Of these, 39 are positive clinically, 24 are probably clinically, and 12 of these 24 are diagnosed as only probable by the X-ray. In eight cases, physical signs were found by both methods, but they were diagnosed as not tuberculous, and in 14 cases, there was an agreement as to the entire freedom of both lungs from abnormalities.

We think these figures rather convincing as to the ability of the stereograph to discover abnormalities and to diagnose them; and although in the great bulk of cases, it tells us no more than a careful clinical examination, yet in a fair number of cases, and these among the most interesting and puzzling it gives additional information. But we must add the caution that a careful history is indispensable, since not even the stereograph can tell an active from a healed lesion.

DISCUSSION.

Dr. F. H. Baetjer.—I have listened with a great deal of pleasure to these three papers and must congratulate the authors on the admirable work they have presented to us tonight.

Dr. Boardman's paper was of great interest to me as I think that he has definitely settled the question as to the meaning of the linear radiation that we see in the X-ray plate of the lungs. As you have been told various theories were held as to the meaning of these lines, some looking upon them as simply being the small bronchi, others as being due to the veins and still others as being due to the arteries. I think that he has shown positively that these lines are due to all three. Dr. Dunham's paper was of special interest to me in that I do not agree with him absolutely as to the interpretation of the linear markings. According to his classification the lung is divided into three zones, first, the markings just outside of the sternum, and these he calls the hilum shadows; second, the prolongation of these shadows out a little beyond the middle of the lungs, and third, the zone that is made up of the linear markings extending to the periphery of the lungs. It is especially with the third zone that we have to deal as it is upon these markings that Dr. Dunham makes his diagnosis of early tuberculosis. These lines are not normally present and he has found that when they are present and extend to the periphery it is due to a tuberculous change. As he himself says this method of diagnosis is empirical and has no pathological basis but that his findings have also been substantiated by the clinical findings. Now it seems to me that this is the point where error could so easily creep in. In the first place the only check upon X-ray findings is the clinical findings and it seems to me that this is not an absolute proof. Secondly, it seems to me that any chronic infection of the lungs could just as easily produce changes in the bands which carry the artery, vein and bronchus. In emphysema and chronic bronchitis we see a marked thickening of these bands extending throughout the lungs. I agree with Dr. Dunham that the irregularities along these linear markings which he has termed "fuzzy" are collections of small tubercles but they are seen in a later stage of the disease. Since the X-ray will give us the slightest changes in density the X-ray plate will naturally record very fine and minute changes. In many of the plates these linear markings are very fine and it seems to me that it is impossible for the clinician either by percussion or auscultation to detect them. Our own experience here in the hospital has been that the radiograph will invariably show greater changes than the clinical findings. Consequently in these very early cases where do not show all the anges in the lung substance or that the auscultation and :cussion have reached a degree of surprising accuracy.

Dr. Dunham deserves a great deal of credit for this piece of rk but at the same time my feeling is that we must have thological instead of clinical substantiation before we can solutely accept this method for the determination of very ly tuberculosis.

Dr. L. V. Hamman.—Dr. Baetjer has discussed these pers from the technical standpoint and perhaps it would well to say a few words about the early diagnosis of lmonary tuberculosis from a clinical standpoint. During six years that the Phipps Dispensary has been in exist- e we have given more study to this particular question n to any other and the change that has gradually come out in our attitude towards it has been a matter of sur- se and of the keenest interest to us. When the dispensary s started those of us who worked there had the average ining and skill that comes from some years of medical vice in hospital and dispensary. This we considered ficient for our needs, but from constant and continuous plication to pulmonary diagnosis we soon developed a ll that made apparent abnormal physical signs that had viously been overlooked. This was the period of greatest isfaction and confidence for the signs meant trouble in lungs and trouble in the lungs spelt tuberculosis and lmonary tuberculosis needed energetic treatment and such atment was followed by improvement. We had innumer- e cases of early pulmonary trouble in those days, many re than you could find in our records now. We were ther intrenched in our confidence by the confirmatory dence lent by tuberculin. To give added assurance we ninistered tuberculin to these patients subcutaneously. about 36 patients so tested at Eudowood all but one re- d. Slight physical signs and the tuberculin reaction ed so smoothly into one another's hands that we at last me suspicious and began to give tuberculin indiscrimi- ly to as many patients as we could control and to our nay found that about 60 per cent of all individuals react, ther they are suspected of having tuberculosis or not. advent of the local tuberculin tests allowed us to apply rculin on a large scale and to verify our previous obser- ns by convincing numbers. This was the check that e us review more cautiously our previous conviction and o a less ready and more difficult judgment of our cases. viduals that formerly would have been peremptorily emned were now kept under observation instead of being d to a sanatorium, and somewhat to our disappoint- , they continued well under ordinary conditions of life ite of the persistence of the abnormal physical signs.

is has brought us to the period where we now are in the clinical symptoms play such an important rôle in guishing active from inactive lesions—of course I can- into details.

e weeks ago a prominent man from the medical clinic remarked "of course the patient has tuberculosis." He was told no we really thought the man did not have tuberculosis, when with assumed surprise he replied "why I had no idea that you ever failed to find tuberculosis in a patient." This was to us a very painful display of lack of knowledge of our aims and methods. However, some days later, speaking to a physician extremely active in tuberculosis work, I mentioned that we had grown more conservative in the diagnosis of early pulmonary tuberculosis and he rebuked me with "yes, I know you have, and even too conservative."

The dispensary then is in a not very enviable position—too hot for medical men and too cold for the specialists. In the predicament the X-ray comes in and offers a helping hand.

The result of the valuable work that Drs. Dunham, Wolman and Boardman have done that interests me most, probably because it brings a ray of comforting reassurance, is the remarkable correspondence between the results of the physical examination and the plate readings. Here is at least something definite that we can hang too. A skillful physical examination—and I emphasize skillful—outlines for us with unexpected precision even slight changes in the lungs. The interpretation of these changes may be and indeed is an occasion of keen discussion. With the objective verification it can no longer be insinuated that the signs are the expression of an imagination stimulated to overwork by a prurient enthusiasm, nor that even such minor changes come within the range of normal variation.

There are three points in the X-ray work that particularly deserve emphasis.

1. The lesion in all cases is more extensive than the physical signs indicate. We have already learned this from autopsies and especially from focal tuberculin reactions and have become accustomed to visualize further than a strict interpretation of the physical signs would permit.

2. While in all of our early cases we discover the earliest signs at the apices the X-ray plates show the most marked changes at or near the hilus and bands radiating from here to the apices. This is hardly in accord with anatomical findings and I would ask Dr. Dunham if he can tell us what is the pathological basis of these dense radiating bands.

3. And most important of all I would say that interpretation of these stereoscopic plates is as expert a bit of skill as the physical examination. It is certainly no reflection upon Dr. Dunham's work when I confess that I am unable to see in the plates all that Dr. Dunham sees there. From plate readings alone Dr. Dunham will diagnose one case definitely pulmonary tuberculosis, and another as suspicious. From physical examination alone we are unable to do this. We turn back and rely on the clinical symptoms to decide whether the lesion is an active or inactive one.

Dr. W. S. Thayer.—I have been considerably impressed during the last year or so with the real value of the radiograms of the chest in suspected tuberculosis.

The diagnosis of an early or later pulmonary tuberculosis is often made only by the gathering together and the carefully weighing of a variety of special observations and the results of a radiographic examination are not infrequently of great importance in leading one to the correct conclusion.

The remarkable agreement between the results of physical examination and the radiogram in the cases reported this evening are extremely satisfactory and encouraging. Th go to show how much can be made out by a true, care physical examination.

The wonderful stereoscopic pictures which Dr. Dunh has been able to show us, mark a real step forward in methods of thoracic investigation.

PAROXYSMAL HEMOGLOBINURIA:

BLOOD STUDIES IN THREE CASES.

By W. L. Moss, M. D.,

Associate in Medicine, Johns Hopkins University.

(From the Research Laboratory, The Phipps Tuberculosis Dispensary, The Johns Hopkins Hospital.)

The studies herein reported have been directed toward the phenomena which the blood of this interesting condition presents, rather than to the clinical features of the disease.

The condition was separated as a clinical entity long ago and the symptom complex sufficiently well known to render diagnosis certain and easy.

From the first recognition of the disease, investigators have busied themselves with the search for an explanation of the remarkable manifestations of the attacks and numerous theories have been advanced to account for them which now have only an historical interest and need not be reviewed, since this already has been done adequately by Eason.[1]

Our present views on the mechanism of the blood destruction during the attacks in this disease date from the publication of Donath and Landsteiner,[2] who showed that hemolysis of the blood of hemoglobinuric patients took place in vitro if the temperature was considerably lowered and then raised.

It had already been suggested, especally by Eason, that the hemolysis in these cases was due to a complex hemolysin of amboceptor-complement nature, whose action bore some relation to temperature, but the proof of the amboceptor-complement nature of the hemolysin, as well as the explanation of the part played by cold, seems not to have been furnished before the work of Donath and Landsteiner just cited.

The fundamental facts brought out by them were as follows:

1. To show the relation of temperature to hemolysis.

Blood from hemoglobinuric patients taken in potassium oxalate solution, to prevent clotting, underwent no hemolysis if kept either at low temperature or at body temperature, but hemolysis occurred if the temperature was first lowered and then raised. The same result followed if a mixture of serum and washed corpuscles from a hemoglobinuric patient was used instead of oxalated blood.

2. To show the amboceptor-complement nature of the hemolysin.

Heating the oxalated plasma to 45° C. for 15 minutes definitely lowered its hemolytic strength, while heating it to 55° C. for 15 minutes destroyed the same.

Corpuscles chilled in oxalated plasma and then removed by centrifugalization did not undergo hemolysis on the addition of normal salt solution or of inactivated hemoglobinuric ser at thermostat temperature, but were promptly dissolved af the addition of fresh normal serum.

On the above evidence the authors convinced themselve the amboceptor-complement nature of the hemolysin and cluded that the serum of paroxysmal hemoglobinuric patie contains a hemolytic amboceptor which requires for its uni with the red blood cell a low temperature, while the union complement and consequent solution of the cell takes pl only at higher temperatures.

While it is true that they bring forth some further exp mental evidence in support of this view, it is perhaps sign cant in the light of the findings of Hoover and Stone,[3] and my own results to be reported presently, that Donath a Landsteiner do not mention in their first communication h ing made any attempts to reactivate hemoglobinuric ser heated to 56° C. by the addition of fresh normal serum.

In a later publication[4] they do report successful reacti tion experiments but it is to be noted that the reactivati serum (complement) was added to the mixture of inacti patient's serum and corpuscles before the mixture was su jected to a low temperature and that their reactivation e periments failed if the hemoglobinuric serum was inacti by subjecting it to a higher temperature than 48° – 50° C. 20 minutes.

Hoover and Stone made very complete studies on cases of paroxysmal hemoglobinuria in which they conf Donath and Landsteiner's conclusions concerning the relat of cold to hemolysis and the amboceptor-complement na of the hemolysin, as indeed most investigators subsequent Donath and Landsteiner have done. In opposition to views of other workers, however, they maintain that, not o does the amboceptor, but also the complement, require a temperature for its union, the lytic action of the complem however, only taking place after the temperature is elevated.

Their views and the experiments upon which they are bas are best given by a direct quotation from their report.

> "0.5 cc. of inactivated H. S. + washed R. B. C. + 5° C. for minutes + 37° C. for one hour.
>
> Now if the normal serum be added and the mixture is pla in the thermostat for many hours, no hemolysis follows.

> failed because a low temrature was not employed in fixing the complementophilic end the amboceptor to the haptophore of the complement. The llowing reactivation experiment proved successful.
>
> 0.5 cc. inactivated H. S. + washed R. B. C. + 0.25 cc. of normal rum + 5° C. for 15 minutes.
>
> The mixture was then warmed to 37° C. and hemolysis followed ımediately.
>
> Thus it is apparent that cold is essential for the fixation of th the cytophilic and the complementophilic ends of the amboptor."

While I have repeatedly confirmed the results of the above periments, I differ with Hoover and Stone as to their inrpretation and will return to this discussion presently.

Meyer and Emmerich[6] have made very exhaustive clinical, matological and serological studies of four cases of paroxysıl hemoglobinuria.

Reference need not be made here to their observations on the ɔod pressure during the paroxysms, the leucocytic changes, e appearance of the derivatives of hemoglobin in the urine ter attacks, nor to the very interesting clinical observations these authors, since the present paper does not deal with ese phases of the disease.

Meyer and Emmerich report that the blood of their patients d not always show hemolysis when subjected to a low temrature followed by high temperature, as described by Donath d Landsteiner. Thus with their first patient they obtained sitive results only 13 times out of 40 tests performed at inrvals during five months. Similarly the test often failed to ve hemolysis with their other three patients.

The negative results are ascribed in most instances to lack complement since they found that positive results were obined much more frequently if normal serum (complement) s added to the mixture of patient's serum and red blood ls.

They found that the complement deficit usually occurred ɔrtly after an attack of hemoglobinuria and ascribed it to using up of complement during the attack; although they ısider that the complement content of the blood undergoes le variation independently of attacks of hemoglobinuria.

t is interesting that the authors found this deficit of comment did not protect the patients from attacks of hemogloıuria, for they observed that at a time when the serum ld be shown to contain no complement the patient might lergo a spontaneous or induced attack; this paradoxical re- they explain on the assumption that complement is ned locally in the surface of the body exposed to the action ɔld.

Vith reference to the union of the red blood cell and am-ɛptor, Meyer and Emmerich state that it makes no differ- whether the complement is added to the mixture of red d cells and inactivated hemoglobinuric serum before or r cooling the mixture, hemolysis taking place equally well ither case.

special attention is directed to this point since it stands in sition to the results of Hoover and Stone and myself.

the blood corpuscle in the cold, but is easily dissociated from the corpuscle at high temperatures." They believe that some of the contradictory reports in the literature are to be explained on this basis. Referring to the work of Hoover and Stone, they say, "While we have seen above, that the binding of the amboceptors to the corpuscles follows in the cold without the presence of complement Hoover and Stone report that the mixture must be cooled in the presence of complement. This appearance is readily explained by the easy dissociability of the amboceptor."

Hoover and Stone do not make the point that the union of red blood cell and amboceptor can take place only at low temperatures in the presence of complement, but that a low temperature is necessary for the union of complement to the corpuscle-amboceptor combination.

There is one paragraph in Hoover and Stone's report which seems to justify the meaning which Meyer and Emmerich ascribe to them, but their further experiments indicate that they did not believe that the presence of complement was necessary for the union between corpuscle and amboceptor to take place, as evidenced by the following quotation from their paper:

> "Thus we have shown that if in two stages, 10 drops of a 10 per cent suspension of red cells be added to (1 cc.) the serum and exposed to cold for one hour each time, the amboceptor can be exhausted from the inactivated hemoglobinuric serum."

Furthermore, Hoover and Stone in a personal communication to me stated that they did not hold that the presence of complement was necessary in order that union take place between corpuscle and amboceptor.

With reference to the resistance of the red blood cells of hemoglobinuric patients, Meyer and Emmerich carried out experiments to show that the resistance to certain destructive agents, such as saponin, was greater if the corpuscles had anchored amboceptor than if they were amboceptor-free and therefore they conclude that it is necessary to use amboceptor-free corpuscles in resistance tests. They state that corpuscles from hemoglobinuric patients are less resistant to temperature changes, mechanical influences, dilute acids, and saponin solutions, but that they do not differ from normal corpuscles in their resistance to anisotonic salt solutions.

No attempt has been made to give a complete review of the literature on paroxysmal hemoglobinuria, or even to bring out all the facts which have been established concerning it. Reference has been confined largely to those phases of the subject with which my own work has dealt.

CASE REPORTS.*

CASE I.—G. C., female, colored, aged eight years.

First Admission to hospital, February 9, 1910.

Diagnosis.—Paroxysmal Hemoglobinuria, Congenital Syphilis.

Complaint.—Blood in urine.

Family History.—Father and mother natives of British Guiana, South America. Father alive and well. Mother alive, subject to asthmatic attacks, menstrual periods characterized by profuse sanguinous discharge and each child-birth has been accompanied by troublesome hemorrhage.

---

* For the privilege of studying and reporting Cases I and II, I am indebted to Dr. S. Amberg, who kindly referred them to me

The first child, a male, was born in British Guiana 14 years ago, and died at the age of nine years of diphtheria, followed by pneumonia. This child was subject to epistaxis, but withstood exposure to cold well.

Second child, female, died a few days after birth of umbilical hemorrhage.

The third child, female, died at the age of one month from umbilical hemorrhage. Bleeding from umbilicus began 12 hours after birth and recurred twice during the month the child lived.

Fourth child (G. C., the present patient), was born eight years ago in Washington, D. C.

Fifth child, male, alive and well.

Sixth child, still-born.

Past History.—Patient suffered from a vaginal hemorrhage shortly after birth. Measles at three years, chicken-pox and diphtheria at four years, typhoid fever at five years, whooping cough at six years. Has had several attacks of tonsillitis, the last being in November, 1908.

Present Illness.—Began five years ago, when it was noticed that exposure to severe cold would be followed in a few hours by a chill and later by fever and the passage of "bloody urine." The elimination of "blood" in the urine has never persisted more than 24 hours after the onset of an attack. Attacks have never occurred during warm weather; they have been most frequent in the spring and fall of the year, especially in cold, damp weather. The patient's mother states that prior to the onset of the present illness, five years ago, exposure to cold frequently caused a profuse eruption of hives over the face and body, but that since the onset of the attacks of hemoglobinuria the patient has never suffered from hives.

The patient suffered an attack on the day before admission to the hospital and another on the morning of admission.

Physical Examination.—A well nourished child, rather small for her age. Pupils widely dilated, react normally. Breathes through mouth, tonsils greatly hypertrophied, rather pale and contain deep crypts. Teeth normal. Considerable exophthalmos, von Graefe's sign positive, thyroid not enlarged.

Lungs.—Clear on percussion and auscultation.

Heart.—Not enlarged, sounds clear except for a slight systolic murmur at apex, which is transmitted but a short distance into axilla.

Liver.—Somewhat enlarged and readily palpable 2 cm. below costal margin in mamillary line. Spleen is hard and is just palpable at costal margin.

Patellar reflex exaggerated, plantar reflex normal, no ankle clonus.

Cervical, axillary, inguinal and epitrochlear lymph glands markedly enlarged.

Urine on admission was of a dark red, smoky color. Sp. Gr. 1015, faintly acid, contained no sugar, much albumin, and gave a positive guiac test for blood. Microscopically a few white blood cells were seen, but no red cells or casts. Subsequent examinations of the urine during the patient's stay in the hospital revealed no abnormality. The temperature on admission was 99.8° F., but fell to normal within a few hours and remained normal.

Blood Examination.—Fresh specimen showed no poikilocytos or anisocytosis, no parasites seen.

R. B. C.	4,000,000
W. B. C.	22,000
Hb.	70%

Wassermann reaction positive.

Patient discharged February 23, 1910.

Second admission to hospital, November 10, 1910.

Patient passed through the summer months without attac but with the onset of cold weather in the autumn the attacks gan to recur.

Wassermann reaction still positive.

Differential blood count on admission:

Polymorphonuclear neutrophiles	50%
Polymorphonuclear eosinophiles	10%
Basophiles	½%
Large mononuclears	9%
Small mononuclears	30%
Transitionals	½%

The above count was made during the interval between attac a considerable time having elapsed since the last attack.

November 15, 1910.—Intravenous injection of 0.3 gram Ehrlich "606." The patient remained in hospital until December 8, 19 During most of this time she was kept in bed and not exposed a sufficient degree of cold to induce an attack of hemoglobinur Nevertheless, on December 3, without premonitory symptoms, s voided a dark brown urine, which gave a positive guiac test f blood. Wassermann reaction positive.

Case II.—F. L., male, colored, aged seven years.

Admitted to hospital November 6, 1910.

Diagnosis.—Paroxysmal Hemoglobinuria, Congenital Syphilis

Complaint.—Blood in urine.

Family History.—Father alive and well, mother alive and w One brother died at two months of age, cause unknown. Mot has had four miscarriages. No positive history of syphilis either parent.

Past History.—At the age of one month the patient had a co junctivitis lasting a week. At two and a half months of a pleurisy, otorrhœa at 18 months of age, pneumonia at one y Since then has had measles and whooping cough.

Patient was shocked by lightning 18 months ago; since then has had at times some pain in right leg and occasional swelling right knee and ankle joints.

Present Illness.—Began in April, 1908, three days before the o set of an attack of measles. After exposure to severe cold tient had a chill, folowed by fever and the passage of "blo urine." Since that time the patient has had very numero attacks, as many as three or four in a week. The attacks o only in cold weather, never in the summer.

Physical Examination.—Normal looking child. Pupils eq and react normally. Teeth appear normal, tonsils enlarged injected. Lungs and heart normal. Liver and spleen not e larged. Patellar reflex normal.

Blood Examination.—Fresh specimen showed no poikilocy or anisocytosis, no parasites seen.

R. B. C.	5,488,000
W. B. C.	10,280
Hb.	74%

Urine Examination.—Specimen is clear yellow. Sp. Gr. 1 Reaction acid, no sugar, no albumen, no sediment. Micros cally no abnormal constituents seen. Guiac test for blood n tive.

Wassermann reaction positive.

Case III.—J. S., male, white, aged 32, Austrian.

Complaint.—Passage of bloody urine following exposure to

---

from the Pediatric Dispensary of the Johns Hopkins Hospital, and to Dr. L. F. Barker, who subsequently admitted the cases to his service in the Johns Hopkins Hospital and permitted these studies to be carried out.

For the privilege of studying Case III, I am indebted to Drs. Hoover and Stone, this being one of the two cases reported by them.

ave and well, one brother dead as result of accident, one half-rother and two half-sisters alive and well.

Past History.—General health has been good. As a child had arlet fever, measles and chicken-pox. Has had grippe repeatedly nd "catches cold" easily. While in the army ten years ago had n attack of arthritis, which kept patient in bed for two weeks, nvalescence occupied several weeks. Pain and swelling started rst in knee joint, then the hip, shoulder, wrist and temporo-axillary joints were successively involved. Venereal infection enied.

Present Illness.—Began December 7, 1902. Following exposure severe cold patient had a chill lasting one-half to one hour, cceeding which there was high fever for two or three hours. he first urine voided following the chill was "bloody." The at-ck was over in five or six hours. Within a week he had a second d ever since has been subject to attacks whenever he gets very uch chilled. They are most frequent during spring and fall, pecially during cold damp weather. He never suffers from them ring the summer.

Wassermann reaction positive.

The hematological studies carried out on the foregoing ses were directed along the following lines:

1. The demonstration of the peculiar hemolysin characteristic of paroxysmal hemoglobinuria.
2. The determination of the group (according to the iso-ag-utination reaction) to which the patients belong and pres-ce or absence of normal iso-hemolysins.
3. Determination of the relation of temperature to the ion of (a) amboceptor and corpuscle, (b) complement and nboceptor-corpuscle.
4. Separation of the auto- and iso-hemolysin contained in e same serum, in order to determine if the auto-hemolysin capable of dissolving those individuals' corpuscles for ich the serum in question contains an iso-hemolysin.
5. Resistance of the red blood cells.
6. Wassermann reaction.
7. Effect of the administration of Ehrlich's "606," (a) on Wassermann reaction, and (b) on the clinical course of disease.

For all of these studies blood was obtained from an arm n by means of an aspirating syringe. The syringe was ays washed out with sterile sodium citrate solution before ng in order to remove the small amount of water which re-ins in the syringe after boiling and which might cause ht laking of the blood.

Iaving drawn the blood into the syringe, 2 or 3 cc. are in-luced into a centrifuge tube containging 12 cc. of a 1.5% ium citrate in 0.85% sodium chloride solution for cor-cles. The remainder of the blood is placed in a sterile cen-uge tube and allowed to coagulate at 37° C. in order to in serum. After the clot has formed the separation of the m is facilitated by a few minutes' centrifugalization. The r serum, which must be perfectly free from hemoglobin, ow pipetted off and transferred to another tube. The her preparation of the corpuscles consists in washing them times in 0.85% sodium chloride solution to free them corpuscles in 0.85% sodium chloride solution.

1. *The demonstration of the peculiar hemolysin characteristic of paroxysmal hemoglobinuria.*

The test employed for this demonstration was carried out as follows * and always gave the same result:

Pt. serum 0.25 cc. + Pt. corp. 0.25 cc. (5 % susp.) 0° C.
½ hr. 37° C. 2hrs. = + hemolysis.
Control: Pt. serum 0.25 cc. + Pt. corps. 0.25 cc. (5% susp.)
37° C. 2 hrs. = 0 hemolysis.

At no time did the blood of any of the three cases reported fail to give hemolysis when subjected to the cold-warm test as indicated above, notwithstanding the fact that repeated tests were made, especially in Case I, which has been under observation for over a year. This is in rather striking contrast with the infrequency of positive results reported by Meyer and Emmerich (only 13 times positive in 40 tests) but may possibly be explained by the fact that I made no especial effort to examine serum from my cases at short intervals after attacks.

2. *The determination of the group (according to the iso-agglutination reaction) to which the patients belong, and presence or absence of normal iso-hemolysins.*

It has been shown[6, 7] that all individuals, regardless of health or disease, can be divided into four groups, according to the ability of their serum to agglutinate the corpuscles of other individuals and of their corpuscles to be agglutinated by the serum of other individuals.

This classification may be stated as follows:

Group I. Serum agglutinates no corpuscles. Corpuscles agglutinated by the serum of Groups II, III and IV.
Group II. Serum agglutinates corpuscles of Groups I and III. Corpuscles agglutinated by the serum of Groups III and IV.
Group III. Serum agglutinates corpuscles of Groups I and II Corpuscles agglutinated by serum of Groups II and IV.
Group IV. Serum agglutinates corpuscles of Groups I, II and III. Corpuscles agglutinated by no serum.

The group to which an individual belongs is established shortly after birth and thereafter undergoes no change.[8] A strict classification of individuals according to the iso-hemolytic properties of the blood has not been accomplished since this reaction, unlike the iso-agglutination reaction, is not entirely constant; certain general laws, however, have been formulated as a result of observations on the iso-hemolytic reaction. Thus the serum of Group I, which contains no iso-agglutinin, never contains an iso-hemolysin, while the corpuscles of Group I may or may not in a given case be hemolysed by the serum of a member of Group II, III or IV.

The serum of a given member of Group II may or may not contain an iso-hemolysin, but if it does it can act only against corpuscles of members of Groups I and III, but not necessarily against the corpuscles of all members of these two groups. Similarly, if a member of Group III contains an iso-hemolysin it can act only against the corpuscles of Groups I and II. The iso-hemolysin of Group IV is effective only against corpuscles of Groups I, II and III. The corpuscles of Group IV are not subject to the action of iso-hemolysin and from what has just been said, the corpuscles of members of the other three groups are never hemolysed by the serum of a member of the corresponding group.

---

* Where the expression "0° C." is used in this paper in describing my own experiments it is to be understood that the tubes were placed in a vessel of ice water ranging in temperature from 0° C. to about 2° C.

The group to which an individual belongs can be readily determined by testing the agglutinating action of his serum against the corpuscles of the four different groups, or by testing the action of serum from the four different groups against the corpuscles of the individual to be classified. This will be made clearer by taking an example.

To determine the group to which an individual, X, belongs:

	First Method.		I.	II.	III.	IV.
1	Serum X 0.25 cc. + Corp. Gr. I 0.25 cc.	37°C 2 hrs.	0	+	+	+
2	Serum X 0.25 cc. + Corp. Gr. II 0.25 cc.		0	0	+	+
3	Serum X 0.25 cc. + Corp. Gr. III 0.25 cc.		0	+	0	+
4	Serum X 0.25 cc. + Corp. Gr. IV 0.25 cc.		0	0	0	0

Column I shows the resulting agglutination if X is a member of Group I and similarly, Columns II, III, and IV show the resulting agglutination if X is a member of Group II, III or IV, respectively.

	Second Method.		I.	II.	III.	IV.
1	Corp. X 0.25 cc. + Serum Gr. I 0.25 cc.	37°C. 2 hrs.	0	0	0	0
2	Corp. X 0.25 cc. + Serum Gr. II 0.25 cc.		+	0	+	0
3	Corp. X 0.25 cc. + Serum Gr. III 0.25 cc.		+	+	0	0
4	Corp. X 0.25 cc. + Serum Gr. IV 0.25 cc.		+	+	+	0

Columns I, II, III and IV show the resulting agglutination if X is a member of Group I, II, III or IV, respectively.

An analysis of the above tables shows that in order to classify an individual it is not necessary to test his blood against blood from all four groups. It is sufficient if his serum is tested against the corpuscles of Groups II and III, or if his corpuscles are tested against the serum of Groups II and III.

Thus if the serum of the individual to be classified agglutinates corpuscles of neither Group II nor III, it must belong to Group I. If it agglutinates corpuscles of Group III, and not those of Group II, it must belong to Group II. If it agglutinates corpuscles of Group II and not those of Group III, it must belong to Group III, while if it agglutinates corpuscles of both Groups II and III, it must belong to Group IV.

It is just as easy to determine the group if one tests the corpuscles of the individual in question against the serum of Groups II and III.

By the methods just described it was determined to which groups the cases here reported belonged and the presence or absence of normal iso-hemolysin repeatedly observed. It will be sufficient to give in detail the results of a single such determination.

Serum and corpuscles were obtained, as previously described, from four normal individuals representing Groups I, II, III and IV, also from Case I, G. C., whose group was t be determined. Tests were carried out acording to the following protocol:

PROT OCOL I.—Case I, G. C.

Tube No.	Serum 0.25 cc.	Corps. (5% susp.) 0.25 cc.		Aggl.	Hem.		Aggl.	Hen
1	Gr. I.	Gr. I.	37°C. 2 hrs.	0	0	37°C. 2 hrs.	0	0
2	"	Gr. II.		0	0		0	0
3	"	Gr. III.		0	0		0	0
4	"	Gr. IV.		0	0		0	0
5	"	G. C.		0	0		0	0
6	Gr. II.	Gr. I.		+	0		+	0
7	"	Gr. II.		0	0		0	0
8	"	Gr. III.		+	0		+	0
9	"	Gr. IV.		0	0		0	0
10	"	G. C.		0	0		0	0
11	Gr. III.	Gr. I.		+	0		+	0
12	"	Gr. II.		+	0		+	0
13	"	Gr. III.		0	0		0	0
14	"	Gr. IV.		0	0		0	0
15	"	G. C.		0	0		0	0
16	Gr. IV.	Gr. I.		+	+	0°C. ½ hr.	+	+
17	"	Gr. II.		+	+		+	+
18	"	Gr. III.		+	0		+	0
19	"	Gr. IV.		0	0		0	0
20	"	G. C.		0	0		0	0
21	G. C.	Gr. I.		+	+		+	-
22	"	Gr. II.		+	+		+	+
23	"	Gr. III.		+	+		+	+
24	"	Gr. IV.		0	0		0	-
25	"	G. C.		0	0		0	-

This experiment shows that the corpuscles of the patie G. C., are neither agglutinated nor hemolysed by the seru of Groups I, II, III or IV, therefore the patient is a me ber of Group IV. This is confirmed by the fact that h serum agglutinates the corpuscles of Groups I, II and III. I is further evident that the patient's serum contains normal is hemolysin, since it is able to hemolyse the corpuscles Groups I, II and III at 37° C. without the mixtures havi been previously exposed to the cold.

In addition to the normal iso-agglutinin and iso-hemoly contained in the patient's serum, which is effective again corpuscles of Groups I, II and III without the action of col (Tubes 21, 22 and 23) there is another hemolysin prese peculiar to paroxysmal hemoglobinuria, which only become evident after the mixture of serum and corpuscles is subjec to a low temperature followed by a high temperature (Tub 24 and 25).

Attention is here directed to another point of difference be tween the action of the hemolysin peculiar to paroxysm hemoglobinuria and normal iso-hemolysin. I have point out elsewhere that normal iso-hemolysis is always accompani or preceded by iso-agglutination. The above experime shows that the hemolysis caused by the hemolysin peculiar paroxysmal hemoglobinuria may occur entirely independent of agglutination (Tubes 24 and 25).

The hemolysin which characterizes the disease with whi we are dealing is often referred to as an auto-hemolysin, sin the patient's serum is able to bring about the solution of h own corpuscles, but as previous investigators have shown a I have repeatedly confirmed, the patient's serum is able hemolyse not only his own corpuscles but those of other hem globinuric patients and normal individuals, therefore it has iso-hemolytic, as well as an auto-hemolytic action.

This iso-hemolytic action of the hemolysin peculiar paroxysmal hemoglobinuria, which becomes evident onl erum of hemoglobinuric patients, as well as normal indiiduals and which does not require previous chilling for its emonstration.

Bearing in mind the fact that it does not fully define the emolytic power of the serum, I shall use the term auto-emolysin to distinguish that property which characterizes the erum of hemoglobinuric patients from the normal iso-hemoytic property which may be possessed by the serum of both ormal and hemoglobinuric individuals.

Similar tests carried out on the other two cases showed that ase II, F. L., is also a member of Group IV, while Case III, . S., is a member of Group III and that the serum of both ases contained, in addition to their auto-hemolysin, normal so-hemolysin.

It now became of interest to determine if the auto-hemosin of hemoglobinuric patients could bring about the soluion of the corpuscles of all individuals; for example, coruscles for which the serum in question contained a normal so-hemolysin.

Before this question can be discussed, certain facts must be iven which resulted from the experiments undertaken to olve the next point in the investigation, namely:

3. *Determination of the relation of temperature to the nion of* (*a*) *amboceptor and corpuscle,* (*b*) *complement and mboceptor-corpuscle.*

Divergent views are held on this subject. As previously entioned, Donath and Landsteiner hold that the union of uto-amboceptor to the corpuscle takes place only at a low emperature, that the union of complement occurs subseuently, and only at a higher temperature. Meyer and Emerich concur in this view, while Hoover and Stone maintain at a low temperature is necessary, not only for the union of e amboceptor and corpuscle but also for the union of the omplement, a higher temperature being necessary, however, r the lytic action of the complement.

It seemed easy to approach this problem by means of ordiary reactivation experiments; accordingly, some of the hemoobinuric serum was inactivated by heating to 56° C. for 20 inutes and the following test performed: 0.5 cc. Pt. serum a. + 0.25 cc. Pt. corps. (5% susp.) 0° C. ½ hr. 37° C. 5 in. + 0.25 cc. complement (non-lytic serum of normal invidual) 37° C. 2 hrs. Result: no hemolysis. The mixture s then held at 0° C. for ½ hour, followed by 37° C. 2 hours. sult: hemolysis.

The above experiment would seem to indicate that a low mperature was necessary for the union of complement as ll as amboceptor; on the other hand, it might be argued at the amboceptor united with the corpuscle during the first posure to a low temperature, but that dissociation took ice when the temperature was elevated before the complent was added, hence the failure of hemolysis at the end of first exposure of 2 hours at 37° C. The positive result emolysis) occurring after the exposure to 0° C., followed a second exposure of 2 hours at 37° C., might be explained plement now being present united as soon as the temperature reached a suitable degree and before dissociation could take place between the amboceptor and corpuscle.

That this explanation is correct seems improbable. Dissociation is said to be hastened by temperatures approaching that of the body and by mechanical measures, such as shaking. In the above experiment mechanical factors were carefully avoided and the exposure to 37° C. was very brief, only five minutes being allowed for the temperature of the mixture to rise from 0°C. to 37° C.

In the next experiment the possibility of dissociation under the influence of temperature was avoided, but mechanical factors (washing the corpuscles) were introduced.

0.5 cc. Pt. serum ina. + 0.25 cc. Pt. corps (5% susp.) 0° C. ½ hour. The corpuscles were then removed by centrifugalization at a low temperature (0° C. to 5° C.) and washed twice with salt solution at 0° C., resuspended in 0.5 cc. salt solution and 0.25 cc. of complement at 0° C. (non-lytic serum of a normal individual) added, while the suspension of corpuscles was still at 0° C. This mixture was then held at 37° C. for 2 hours, and as no hemolysis resulted the temperature was lowered to 0° C. for ½ hour and then again held at 37° C. for 2 hours. Result: no hemolysis.

The failure of hemolysis in this experiment might possibly be ascribed to dissociation of the amboceptor and corpuscle under the influence of the mechanical disturbance of washing.

The following experiment indicates that the explantions thus far offered are not correct. 1 cc. Pt. serum + 0.1 cc. Pt. corps., containing as little salt solution as possible, were subjected to a temperature of 0° C. for ½ hour, then centrifugalized at a low temperature (0° — 5° C.), the supernatent fluid removed and saved for further tests, and the corpuscles washed three times with salt solution at 0° C. to remove all the serum from them. They were then suspended in 0.75 cc. salt solution and kept at 37° C. for 2 hours. Result: no hemolysis. Complement was now added (0.25 cc. of normal non-lytic serum) and the temperature maintained at 37° C. Result: prompt hemolysis.

The following seems to be the only explanation which will harmonize the results of all the foregoing experiments: *Union between the auto-amboceptor and the corpuscle takes place only at a low temperature in the presence of complement; the complement does not enter into the combination, or at least not permanently, at this temperature. Complement does unite with the corpuscle-amboceptor combination at 37° C. with resulting solution of the cell.*

The last experiment further shows that the union between amboceptor and corpuscle is a fairly stable one, since repeated washing at a low temperature and subsequent standing for 2 hours at 37 C. does not cause dissociation.

If the above explanation is correct, then the serum in the last experiment, which was removed after standing in contact with the corpuscles at a low temperature, should have been deprived of its auto-amboceptor, but not of its complement (provided the proper quantitative relations were observed). The following tests were made to determine these points:

0.25 cc. serum from previous test + Pt. corps. 0.25 cc. (5% susp.) 0° C. ½ hr. 37° C. 2 hrs. = no hemolysis.

0.25 cc. serum from previous test + 0.25 cc. complement (normal non-lytic serum) + Pt. corps. 0.25 cc. (5% susp.) 0° C. ½ hr. 37° C. 2 hrs. = 0 hemolysis.

0.25 cc. serum from above + 0.25 cc. Pt. serum ina. + 0.25 cc. Pt. corps. 0°C. ½ hr. 37° C. 2 hours = + hemolysis.

These three tests show that all of the auto-amboceptor had been removed from the patient's serum by contact with patient's corpuscles at a low temperature, but that complement remained, thus corroborating the findings when the corpuscles were examined and found to have anchored amboceptor, but not complement, at the low temperature.

If this interpretation of the results is correct, it furnishes an example of a hitherto undescribed function of complement; namely, the ability to effect a combination between two other bodies (amboceptor and corpuscle) without itself entering permanently into the combination.

We are now in a position to consider the question previously mentioned as to the ability of the auto-hemolysin contained in the serum of a hemoglobinuric patient to bring about the solution of corpuscles for which the same serum contains an iso-hemolysin.

4. *Separation of the auto- and iso-hemolysin contained in the same serum in order to determine if the auto-hemolysin is capable of dissolving those individuals' corpuscles for which the serum in question contains an iso-hemolysin.*

Reference to Protocol I, of experiments carried out on the serum of Case I, G. C., shows that the serum of this patient contained an iso-hemolysin for the corpuscles of a normal individual belonging to Group I, for one belonging to Group II and for one belonging to Group III (Tubes 21, 22 and 23) in addition to the auto-hemolysin for an individual belonging to Group IV and for her own corpuscles.

In order to determine if the auto-hemolysin is capable of dissolving the corpuscles of the individuals belonging to Groups I, II and III it is first necessary to remove the iso-hemolysin. To this end, serum and corpuscles were obtained as follows:

No. 3 normal individual belonging to Group III.
No. 4 normal individual belonging to Group IV.
No. 5, Case I, G. C., hemoglobinuria patient, Group IV.

A portion of serum 5 (Case I, G. C.) was inactivated by heating at 56° C. for 20 minutes and the experiments were performed as shown in Protocol II.

Tubes 1 to 9 inclusive, in Protocol II are controls and show as follows:

Tube 1 shows that serum 4, which was used as complement contained no iso-hemolysin for corpuscles 3.

Tube 2 shows that serum 5 contained an iso-hemolysin for corpuscles 3 (reading at end of first two hours at 37° C.).

Tubes 3 and 4 show that serum 5 contains no iso-hemolysin for corpuscles 4 and 5 (reading at end of first two hours at 37° C.), but that it does contain an auto-hemolysin for these corpuscles (reading after ½ hour at 0° C. + 2 hours at 37° C.).

Tube 5 shows that the iso-hemolysin in serum 5 was inactivated for corpuscles 3 by heating to 56° C. for 20 minutes.

Tube 6 shows that the auto-hemolysin (if effective against corpuscles 3) had been inactivated by heating to 56° C. for 20 minutes.

Tube 7 shows that the auto-hemolysin contained in serum 5 for corpuscles 5 had been inactivated by heating to 56° C. for 20 minutes.

Tube 8 shows that serum 4 was capable of activating the iso-amboceptor contained in serum 5 for corpuscles 3.

Tube 9 shows that serum 4 was capable of activating the auto-amboceptor contained in serum 5 for corpuscles 5.

PROTOCOL II.

To absorb the iso-hemolysin from hemoglobinuric serum leaving the auto-hemolysin and determine if the latter is capable of dissolving an individual's corpuscles (No. 3) for which the hemoglobinuric serum contains an iso-hemolysin

1. Ser. 4, ¼ cc. + Corps. 3, ¼ cc. 37°C. 2 hrs. = 0 hem.
2. Ser. 5, ¼ cc. + Corps. 3, ¼ cc. 37°C. 2 hrs. = + hem. 0°C. ½ hr. 37°C. 2 hrs. = + hem.
3. Ser. 5, ¼ cc. + Corps. 4, ¼ cc. 37°C. 2 hrs. = 0 hem. 0°C. ½ hr. 37°C. 2 hrs. = + hem.
4. Ser. 5, ¼ cc. + Corps. 5, ¼ cc. 37°C. 2 hrs. = 0 hem. 0°C. ½ hr. 37°C. 2 hrs. = + hem.
5. Ser. 5 ina., ¼ cc. + Corps. 3, ¼ cc. 37°C. 2 hrs. = 0 hem.
6. Ser. 5 ina., ¼ cc. + Corps. 3, ¼ cc. 0°C. ½ hr. 37°C. 2 hrs. = 0 hem.
7. Ser. 5 ina., ¼ cc. + Corps. 5, ¼ cc. 0°C. ½ hr. 37°C. 2 hrs. = 0 hem.
8. Ser. 5 ina., ¼ cc. + Corps. 3, ¼ cc. + Comp. (Ser. 4) ¼ cc. 37°C. 2 hrs. = + hem.
9. Ser. 5 ina., ¼ cc. + Corps. 5, ¼ cc. + Comp. (Ser. 4) ¼ cc. 0°C. ½ hr. 37°C. 2 hrs. = + hem.
10. Ser. 5 ina., 1½ cc. + Corps. 3, $\frac{8}{100}$ cc. 37°C. 2 hrs.
Centrifugalize, save serum, wash corps.
11. Ser. tube 10, ¼ cc. + Corps. 3, ¼ cc. + Comp. (Ser, 4) ¼ cc. 37°C. 2 hrs. = 0 hem.
12. Ser. tube 10, ¼ cc. + Corps. 5, ¼ cc. + Comp. (Ser. 4) ¼ cc. 0°C. ½ hr. 37°C. 2 hrs. = + hem.
13. Ser. tube 10, ¼ cc. + Corps. 3, ¼ cc. + Comp. (Ser. 4) ¼ cc. 0°C. ½ hr. 37°C. 2 hrs. = + hem.
14. Washed corps. tube 10 + NaCl ¾ cc. + Comp. (Ser. 4) ¼ cc. 37°C. 2 hrs. = + hem.
15. Ser. 5 ina., 1½ cc. + Corps. 3, $\frac{8}{100}$ cc. 0°C. 2 hrs.
Centrifugalize, save serum, wash corps.
16. Ser. tube 15, ¼ cc. + Corps. 3, ¼ cc. + Comp. (Ser. 4) ¼ cc. 37°C. 2 hrs. = 0 hem.
17. Ser. tube 15, ¼ cc. + Corps. 5, ¼ cc. + Comp. (Ser. 4) ¼ cc. 0°C. ½ hr. 37°C. 2 hrs. = + hem.
18. Ser. tube 15, ¼ cc. + Corps. 3, ¼ cc. + Comp. (Ser. 4) ¼ cc. 0°C. ½ hr. 37°C. 2 hrs. = + hem.
19. Washed corps. tube 15 + NaCl ¾ cc. + Comp. (Ser. 4) ¼ cc. 37°.C 2 hrs. = + hem.

Wherever inactive serum was used in the above experiment it is indicated by the abbreviation "ina." Elsewhere active serum was used.

The corpuscles were used in 5% suspension except in tubes 10 and 15, where all the supernatant salt solution after centrifugalization was removed from the corpuscles before they were used.

Tube 10 was to absorb the iso-amboceptor from serum 5 inactive at 37° C. by means of corpuscles 3.

Tube 11 shows that all of the iso-amboceptor for corpuscles 3 had been absorbed from serum 5 inactive in tube 10.

Tube 12 shows that the auto-amboceptor had not been removed from serum 5 inactive in tube 10.

Tube 13 shows that the auto-amboceptor contained in serum 5 inactive was capable of dissolving an individual's corpuscles (corpuscles 3) for which the hemoglobinuric serum contained an iso-hemolysin, Q. E. D.

Tube 14 shows that the corpuscles in tube 10 had anchored an iso-amboceptor from serum 5 inactive, which was not separated from the cells by washing twice at room temperature with 10 cc. salt solution at each washing.

Tube 15 was to absorb the iso-amboceptor from serum 5 inactive at 0° C. by means of corpuscles 3. (I have previously ig tubes confirmed this statement).

Tubes 16, 17, 18, 19 gave results identical with those given y tubes 11, 12, 13, 14, again proving that the auto-hemolysin f hemoglobinuric serum is capable of dissolving an indi-idual's corpuscles for which the serum contains an iso-emolysin.

Having absorbed the iso-hemolysin from hemoglobinuric rum and left the autohemolysin, it seemed desirable, in rder to complete this part of the study, to absorb the auto-emolysin from hemoglobinuric serum and leave the iso-emolysin. This was readily accomplished in the following anner:

Blood was obtained from—

No. 1. A normal individual belonging to Group I.

PROTOCOL III.

ıbsorb the auto-amboceptor from hemoglobinuric serum leaving the iso-ambo-r.

r. 5, ¼ cc. + Corps. 1, ¼ cc. 37°C. 2 hrs. = + hem. 0°C. ½ hr. 37°C. 2 hrs. = + hem.
r. 5, ¼ cc. + Corps. 4, ¼ cc. 37°C. 2 hrs. = 0 hem. 0°C. ½ hr. 37°C. 2 hrs. = + hem.
r. 5, ¼ cc. + Corps. 5, ¼ cc. 37°C. 2 hrs. = 0 hem. 0°C. ½ hr. 37°C. 2 hrs. = + hem.
r. 4. ¼ cc. + Corps. 5. ¼ cc. 37°C. 2 hrs. = 0 hem. 0°C. ½ hr. 37°C. 2 hrs. = 0 hem.
r. 5 ina., ¼ cc. + Corps. 1, ¼ cc. 37°C. 2 hrs. = 0 hem. 0°C. ½ hr. 37°C. 2 hrs. = 0 hem.
r. 5 ina., ¼ cc. + Corps. 5, ¼ cc. 0°C. ½ hr. 37°C. 2 hrs. = 0 hem.
r. 5 ina., ¼ cc. + Corps. 1, ¼ cc. + Comp. (ser. 4) 1/10 cc. 37°C. 2 hrs. = + hem.
r. 5 ina., ¼ cc. + Corps. 5, ¼ cc. + Comp. (ser. 4) 1/10 cc. 0°C. ½ hr. 37°C. 2 hrs. = + hem.
r. 5, 1 cc. + Corps. 5, 1/20 cc. 0°C. ½ hr. Centri-ugalize at 0°C. same serum and wash corpuscles hree times at 0°C.
ıe-half the washed corps. from tube 9 + NaCl 0.45 cc. 37°C. 2 hrs. = 0 hem.
ıe-half the washed corps. from tube 9 + NaCl 0.45 cc. - Comp. (ser. 4) 1/10 cc. 37°C. 2 hrs. = + hem.
r. tube 9, ¼ cc. + Corps. 5, ¼ cc. 0°C. ½ hr. 37°C. 2 hrs. = 0 hem.
r. tube 9, ¼ cc. + Corps. 5, ¼ cc. + Comp. (ser. 4) 1/10 cc. 0°C. ½ hr. 37°C. 2 hrs. = 0 hem.
r. tube 9, ¼ cc. + Corps. 5, ¼ cc. + Ser. 5 ina., ¼ cc. 0°C. ½ hr. 37°C. 2 hrs. = + hem.
r. tube 9, ¼ cc. + Corps. 1, ¼ cc. 37°C. 2 hrs. = + hem.

rever inactive serum was used in the above experiments it is indicated by the viation "ina." Elsewhere active serum was used.

corpuscles were used in 5% suspension except in tube 9, where all the super-t salt solution after centrifugalization was removed from the corpuscles e they were used.

No. 4. A normal individual belonging to Group IV.

No. 5. Case I, G. C., hemoglobinuric patient, Group IV.

Tubes 1 to 8 inclusive are controls and show as follows:

Tube 1 shows that serum 5 contains an iso-hemolysin for rpuscles 1 (reading at the end of first 2 hours at 37° C.).

Tubes 2 and 3 show that serum 5 contains an auto-hemo-sin for corpuscles 4 and 5 (reading after ½ hour at 0° C. d 2 hours at 37° C.).

Tube 4 shows that serum 4 contains neither iso- nor auto-molysin for corpuscles 5, therefore it can be used for com-ment, provided it is able to reactivate serum 5 inactive.

Tube 5 shows that both the iso- and auto-hemolysin con-ned in serum 5 for corpuscles 1 were inactivated by heating 56° C. for 20 minutes.

Tube 6 shows that the auto-hemolysin contained in serum or corpuscles 4 was inactivated by heating to 56° C. for 20 nutes.

Tubes 7 and 8 show that serum 4 (complement) is capable serum 5 inactive.

Tube 9 was to absorb the auto-amboceptor from serum 5 by means of corpuscles 5 at 0° C. Hemolysis was prevented by keeping the mixture at a low temperature until after the serum had been removed from the corpuscles and the latter thoroughly washed with salt solution.

Tube 10 shows that the corpuscles did not anchor, at least not permanently, both auto-amboceptor and complement at 0° C.

Tube 11 shows that the corpuscles did anchor the auto-amboceptor at 0° C., that dissociation did not occur as a result of thorough washing of the corpuscles and that complement united at 37° C. with consequent solution of the corpuscles. This and tubes 12, 13, 14 are a repetition and confirmation of experiments done many times under subhead 3; namely: Determination of the relation of temperature to the union of (a) amboceptor and corpuscle (b) complement and amboceptor-corpuscle.

Tube 12 shows that serum 5 after absorbtion with corpuscles 5 in tube 9 at 0° C. was unable to dissolve corpuscles 5.

Tube 13 shows that the failure of hemolysin in tube 12 was not due to lack of complement.

Tube 14 shows that the failure of hemolysis in tube 12 was due to lack of auto-amboceptor only.

Tube 15 shows that the auto-amboceptor was absorbed from serum 5 in tube 9, leaving iso-amboceptor and complement, Q. E. D.

Hoover and Stone were able to absorb the auto-amboceptor from hemoglobinuric serum in the absence of complement, as indicated by the following quotation, to which reference has previously been made: "Thus we have shown that if in two stages, 10 drops of a 10% suspension of red cells be added to (1 cc.) the serum and exposed to cold for one hour each time, the amboceptor can be exhausted from the inactivated hemoglobinuric serum." It seems probable that this result is to be explained on the basis of a mechanical removal due to the relatively large amount of corpuscles used. Even so they found it necessary to absorb in two stages.

In my efforts to separate the auto- and iso-amboceptor in hemoglobinuric serum I found it necessary to use the minimum quantity of corpuscles which would completely remove the one in order that the other be left. In case an excess of corpuscles was employed both auto- and iso-amboceptor would be removed.

5. *Resistance of the red blood corpuscles.*

Certain investigators have observed that the red blood cells of hemoglobinuric patients studied by them were less resistant to hypotonic salt solution than normal, while other investigators have found no difference between normal corpuscles and the corpuscles of their patients in relation to hypotonic salt solution. Dr. Helen Watson kindly tested this point for me in my three cases. The corpuscles of Cases I and II were tested on two occasions, an interval of about two months elapsing between tests. The corpuscles of Case III were only tested once. The corpuscles of all three patients showed definitely increased resistance to hypotonic salt solution. The only exception to this rule was Case II, whose corpuscles, at the time of the second test, showed the same resistance as those of several normal individuals, tested at the same time, but on the occasion of the first test they showed a markedly greater resistance than normal corpuscles.

It has been shown by numerous investigators that the destruction of erythrocytes during the paroxysms of this disease is not due to any inherent weakness of the cells but to a peculiar action of the serum of these patients and that this serum is capable of dissolving not only the corpuscles of hemoglobinuric patients, but also those of normal individuals. With the exception of the variation of resistance of hemoglobinuric corpuscles I know of no reason why they may not be regarded as normal corpuscles. That they show a variable and sometimes greater than normal resistance may possibly be explained in the following way.

It seems reasonably certain that the individual corpuscles of any person differ in their resistance. This idea is based on the fact that if one sets up a series of tubes containing falling strengths of salt solution (3 cc. in each tube) and introduces one drop (approximately 1/30 cc.) of corpuscles into each tube, it will be observed that hemolysis begins in a dilution of about 0.475% NaCl but is not complete until a dilution of about 0.30% is reached. That is, in the tube containing 0.475% NaCl only a few of the introduced corpuscles are dissolved. That these few are dissolved and the others are not seems to be best explained on the assumption that those corpuscles which were dissolved were less resistant to the action of hypotonic salt solution than the remainder of the corpuscles. That the small amount of serum (or iso-tonic salt solution) introduced with the drop of corpuscles plays but little part in altering the tonicity of the mixture is evident from the proportion used, 3 cc. 0.475% NaCl + 1/30 cc. 0.85% NaCl gives 3 1/30 cc. of a 0.479% solution. The slight increase of tonicity of the 0.475% solution due to the addition of the salt carried over with the one drop of corpuscles and to the solution of a part of the corpuscles, might protect the remainder of the corpuscles, but this explanation cannot serve in the case of a 0.40% salt solution where only a portion of the added corpuscles undergoes solution. In this case 1/30 cc. 0.85% NaCl added to 3 cc. of 0.40% NaCl brings the concentration of the resulting mixture only up to 0.405%, which is still relatively far below that in which hemolysis first appeared (0.475%). In the above examples the entire drop of corpuscles has been considered as the equivalent of 0.85% salt solution, whereas it probably has something less than this value in raising the tonicity of the mixture.

Assuming that individual corpuscles of a person vary in their resistance to hypotonic salt solution, it seems not unlikely that they differ in their resistance to other destructive agents, and that during an attack of paroxysmal hemoglobinuria those corpuscles possessing the least resistance would be the ones destroyed, leaving the more resistant ones. If this theory is correct, a resistance test taken shortly after an attack of hemoglobinuria would show increased resistance, while a test taken at a considerable interval after an attack would show normal relations. The correctness of this theory remains to be proven.

6. *The Wassermann Reaction.*

In the reported cases of paroxysmal hemoglobinuria, evidence of syphilis, usually congenital, has been observed so often as to give weight to the suggestion frequently made that the latter perhaps stands in an etiological relationship. All efforts to find an infectious agent in the blood of these patients have, so far as I am aware, failed. The idea advanced that the disease is due to an auto-immunization resulting from the resorption by the patient of his own blood has never been proven and there is but scant evidence in its support. Of the various suggestions made that of congenital syphilis seems to have most evidence in its favor.

Dr. C. R. Austrian kindly did the Wassermann reaction on the three cases here reported. All gave positive reactions. Tests were done on both the father and mother of Case I, and the mother was found also to give a positive reaction. The father of Case II gave a negative reaction and although the mother was not tested, the history of four miscarriages in the mother is suggestive.

Case III gave no history of syphilis, but had, as stated, a positive Wassermann reaction.

7. *The effect of the administration of Ehrlich's "606" (a) on the Wassermann reaction; (b) on the clinical course of the disease.*

On November 15, 1911, Case I was given 0.3 gram "606" intravenously. She remained in the hospital until December 8, 1910. During most of this time she was kept in bed and not exposed to a sufficient degree of cold to induce an attack of hemoglobinuria. Nevertheless, on December 3, without premonitory symptoms, she voided a dark brown urine which gave a positive guiac test for blood, as is stated in the case history. The Wassermann reaction was still positive.

After the child's discharge from the hospital, she had no further attack until about March, 1911. The freedom from attacks during the interval, the patient, since the onset of the disease, never having gone so long during cold weather without attacks, led the mother to believe that a cure had been effected. Accordingly, of her own initiative and without my knowledge, she frequently sent the child out to play during cold, damp weather, without hat or coat, in order to see if an attack would be induced. Notwithstanding this marked improvement in the clinical condition, the patient's serum is still able, in vitro, to hemolyse her own and other corpuscles, when subjected to the cold-warm test, although not to the same degree, I think, as before the administration of "606," and she still has a positive Wassermann reaction.

It seems advisable to repeat the administration of "606" in this case, and I hope to have the opportunity of trying it on the other two cases before the onset of cold weather.

SUMMARY.

The serum of patients suffering from paroxysmal hemoglobinuria contains a complex hemolysin, of amboceptor-complement nature, which is capable of bringing about the

hemoglobinuric patients, and of all other indiiduals, as far as tested.

Patients suffering from paroxysmal hemoglobinuria are not onfined to one group, as determined by the iso-agglutination eaction, and their serum may contain normal iso-hemolysin n addition to the hemolysin characteristic of their disease.

The auto-amboceptor may be absorbed from patient's serum, eaving the iso-amboceptor and conversely the iso-amboceptor nay be absorbed, leaving the auto-amboceptor, thus enabling each to be tested separately on any given set of corpuscles.

Only the amboceptor component of the hemolysin of paoxysmal hemoglobinuria is peculiar to the disease. The comlement differs in no way, so far as tested, from that present n normal serum.

The amboceptor peculiar to paroxysmal hemoglobinuria liffers from other known hemolytic amboceptors in that it will mite with the red blood corpuscles only at a low temperature n the presence of complement, and furthermore, in that it is apable of bringing about the solution of the patient's own ells (auto-hemolytic action) and those of other members f the group to which the patient belongs, as well as the cells f members of other groups.

Hemolysis due to the auto-hemolysin of paroxysmal hemolobinuria unlike normal iso-hemolysis, may occur entirely ndependently of agglutination.

The red cells of the three cases here reported showed a ariable and usually increased resistance to hypotonic salt soition. Never a resistance less than that of normal corpuscles.

Case I received 0.3 gram Ehrlich's "606" in November, 1910. Prior to that time the patient, never, since the onset of the disease, went more than two or three weeks, except during summer, without an attack of hemoglobinuria, and often had attacks at shorter intervals. Since receiving "606," the Wassermann reaction has remained positive, but the patient has, up to the present time, May, 1911, suffered but two attacks, although repeatedly exposed to cold.

REFERENCES.

1. Eason: Pathology of paroxysmal hemoglobinuria. Edinburgh M. J., 1906, XIX, 43; J. Path. and Bacteriol., 1906-7 XI, 167.

2. Donath and Landsteiner: Ueber paroxysmale Hämoglobinurie. München. med. Wchnschr., 1904, LI² 1590.

3. Hoover and Stone: Paroxysmal hemoglobinuria. Arch. Int. Med., 1908, III, 392.

4. Donath and Landsteiner: Ueber paroxysmale Hämoglobinurie. Ztschr. f. klin. Med. Berl., 1906, LVIII, 173.

5. Meyer and Emmerich. Ueber paroxysmale Hämoglobinurie. Deutsches Arch. f. klin. Med., 1909, XCVI, 287.

6. Janský: Hämatologische Studien bei Psychotikern. Sborn. klin., v. Praze, 1906-7, VIII, 85. Ref. Jahresb. f. Neurol. u. Pschiat., 1907.

7. Moss: Studies on Iso-agglutinins and Iso-hemolysins. Johns Hopkins Hosp. Bull., 1910, XXI, 63.

8. Decastello and Sturli: Ueber die Iso-agglutinine im Serum gesunder und kranker Menschen. München. med. Wchnschr., 1902, XLIX, 26, 1090.

HE CALCIFICATION OF THE COSTAL CARTILAGES, THE CARDIO-THORACIC INDEX AND OTHER SIGNS OF PULMONARY TUBERCULOSIS.

By W. W. Boardman, M. D.,

Assistant Physician, The Phipps Tuberculosis Dispensary, The Johns Hopkins Hospital,

AND

H. Kennon Dunham, M. D., Cincinnati.

The radiographic diagnosis of pulmonary tuberculosis is sed upon more or less characteristic alterations in the idows of the hilum and lung fields, and by some radioiphers also upon alterations in the shadow of the heart, diaragm and thoracic walls. The alterations in the shadows the hilum and lung fields are dependent upon morbid nges present in the lungs and hilum, as a result of the il activity of the tubercle bacilli. The alterations in the dows of the heart, diaphragm and thoracic walls are due changes in these structures, and are generally considered either secondary changes, or as predisposing factors to the monary disease. In a previous article[1] we have considerit length the appearance and diagnostic value of the shadows of the hilum and lung fields. At this time we wish to consider the nature and diagnostic value of the alterations in the shadows of the heart, diaphragm and thoracic walls.

On reviewing the literature one finds that there are many alterations in the shadows of these structures, to which more or less importance has been attached. The most frequently mentioned are the "small pendulous heart," and the calcification of the rib cartilages. Other alterations noted are narrow interspaces, contraction of one side of the thoracic wall, decrease in the angle made by the neck muscles and the clavicle, various abnormalities in the shape of the upper aperture of the chest cavity, alterations in the outline and height of the diaphragm, etc.

For the studies here reported, the radiographs taken in connection with the stereo-rœntgenographic work done in the Research Laboratory of the Phipps Dispensary of the Johns Hopkins Hospital, were used. In taking these plates the relative position of X-ray tube, patient, and photographic plate was the same in every case. As previously reported, each patient radiographed was subjected to careful clinical examination and the conclusions, independently arrived at by these different methods of examination, compared. In this series only those cases are considered in which there was complete agreement in the findings by both clinical and radiographic examination.

---

[1] ee first paper in this number.

Turning now to a consideration of the heart in pulmonary tuberculosis, we wished to determine, if possible, the occurrence of any characteristic alteration in the heart shadow which might be of diagnostic value. As previously stated, the so-called "small pendulous heart" is most frequently mentioned by radiographers as a sign of value. By some it is considered as merely indicating a marked predisposition to pulmonary tuberculosis; by others, however, it is considered a change secondary to tuberculous infection of the lungs. In studying this question a series of ninety-eight cases was examined, in which the clinicians had given special attention to the condition of the heart. As a basis of comparison of individual cases or of groups of cases, it is evident that the actual area of the cardiac shadow would be valueless, as this must vary with the size, age, sex, etc., of the patient. It was, therefore, necessary to consider the size of the heart shadow in comparison with the size of some other shadow, the original of which varies in the same way as does the heart with the size, age, sex, etc., of the patient. To this end the greatest transverse diameter of the heart shadow was compared with the greatest transverse diameter of the chest shadow and the resulting ratio, which therefore expresses the size of the heart in relation to the size of the chest, was termed the Cardio--Thoracic Index.

TABLE I

SHOWING THE INFLUENCE OF SEX UPON THE CARDIO-THORACIC INDEX.

Sex	No. of Cases	Cardio-Thoracic Index Average	Max.	Min.
Male	47	0.446	0.52	0.35
Female	 33	0.430	0.50	0.37

Table I shows that in the cases examined the average cardio-thoracic index, independent of age or physical condition, was slightly greater in the males than in the females.

TABLE II

SHOWING THE INFLUENCE OF AGE UPON THE CARDIO-THORACIC INDEX.

Age	No. of Cases	Cardio-Thoracic Index Average	Max.	Min.
0-5 years	 3	0.456	0.47	0.39
5-15 years	 11	0.446	0.50	0.41
15-30 years	 45	0.450	0.50	0.37
30-40 years	 15	0.443	0.52	0.39
40-50 years	 4	0.42	0.52	0.40
50-60 years	 2	0.42	0.45	0.40

Table II shows the cardio-thoracic index, independent of sex or physical condition, to be practically constant in the different age periods, with a slight tendency to decrease in later life.

TABLE III

SHOWING THE INFLUENCE OF PULMONARY TUBERCULOSIS UPON THE CARDIO-THORACIC INDEX.

Stage of Disease	No. of Cases	Cardio-Thoracic Index Average	Max.	Min.
Neg.	 14	0.452	0.50	0.35
Doubt.	 16	0.440	0.48	0.39
I Stage	 6	0.435	0.46	0.41
II Stage A	 14	0.437	0.50	0.37
II Stage B	 13	0.449	0.48	0.40
III Stage	 17	0.438	0.52	0.39

Table III is of special importance. As will be seen, the cases are divided into Non-Tuberculous, Doubtful and Tuberculous. The Tuberculous are sub-divided into four groups depending on the stage of the disease,—first stage, early second stage, late second stage and third stage. Here the cardio-thoracic index is practically constant in the different groups with, however, a slight tendency for the average to be smaller in the tuberculous than in the non-tuberculous and doubtful cases. However, one fact must be borne in mind, and this is that the cardio-thoracic index varies between fairly wide limits in the individual cases, both normal and tuberculous as is shown by the maximum and minimum indices given in the various tables.

TABLE IV

SHOWING THE INFLUENCE OF CARDIO-VASCULAR DISEASE UPON THE CARDIO-THORACIC INDEX.

Disease	No. of Cases	Cardio-Thoracic Index Average	Max.	Min.
Myocarditis	 5	0.564	0.59	0.54
Mitral Insufficiency	7	0.502	0.57	0.43
Aneurism	 6	0.543	0.58	0.52

Table IV shows a high cardio-thoracic index in 18 cases with definite cardiac lesions. These cases naturally are not included in the previous tables.

From our pathological experience we know that a small heart is a common finding in individuals dead of chronic wasting disease, such as tuberculosis, carcinoma, etc. Here the small heart is merely an expression of the general wasting and is not characteristic of any special disease process. Thus in one of our cases, dead of carcinoma of the oesophagus, the radiograph taken just before the autopsy showed a cardio-thoracic index of 0.37. However, in our third stage cases (Table III) which were all ambulatory, the average cardio-thoracic index was 0.438 with the maximum 0.52 and a minimum of 0.39. Evidently, then, the small heart is far from constant even in third stage cases. Now as the value of the radiographic examination must depend upon one's ability to discover disease processes at a time when the clinician is still doubtful, or anxious for confirmation of his findings, it is

stages
f the disease.

From the preceding we may safely conclude that the average ardio-thoracic index is practically constant in the different ge periods, that it is slightly smaller in females than in ales, and that in the tuberculous, although on the average shows a very slight tendency to be somewhat smaller than the non-tuberculous, this average tendency is so slight and aries so widely in individual cases, that it cannot be considered a sign of any value in the radiographic diagnosis of pulonary tuberculosis.

The pendulous character of the heart shadow, sometimes escribed as significant of pulmonary infection, is dependent r its appearance upon the small size of the heart and must erefore share with the cardio-thoracic index the same lack value as a diagnostic sign.

Regarding the occurrence and diagnostic value of calcifiation of the rib cartilages, two theories have been advanced. he one that calcification, by interfering with the free movement of the thoracic walls, renders proper aeration of the pices impossible and therefore acts as a strong predisposing ctor to pulmonary tuberculosis, the other that the calcifiation is secondary to the pulmonary disease and depends pon altered metabolic processes. Pathological experience ems to favor the latter view. In tables V-VII, the results the investigation of 153 cases are tabulated. Cases showing mplete calcification of the first cartilage, with or without lcification of the other cartilages, are designated positive. ases showing partial calcification of the first cartilage, with without partial calcification of the other cartilages, are esignated slight.

TABLE V

IOWING THE INFLUENCE OF SEX UPON THE CALCIFICATION OF THE RIB CARTILAGES.

Sex	No. of Cases	Calcification % +	 % Slight	 % —
Male	85	30	22	48
Female	68	17	17	66

able V shows that calcification was more common in the le cases, independent of age and physical condition.

TABLE VI

WING THE INFLUENCE OF AGE UPON CALCIFICATION OF THE RIB CARTILAGES.

Age	No. of Cases	Calcification % +	 % Slight	 % —
0-5 years	6	0	0	100
5-15 years	20	0	0	100
15-30 years	78	19	17	64
30-40 years	29	33	33	34
40-50 years	9	40	47	13
50-60 years	9	68	32	0
60-70 years	2	50	50	0

TABLE VII

SHOWING THE INFLUENCE OF PULMONARY TUBERCULOSIS UPON CALCIFICATION OF THE RIB CARTILAGES.

Stage of Disease	No. of Cases	Calcification % +	 % Slight	 % —
Neg.	37	36	28	36
Doubt.	35	10	27	63
I Stage	9	0	10	90
II Stage A	37	19	22	59
II Stage B	16	22	7	71
III Stage	19	46	5	54

Table VII shows that calcification was present in a large percentage of the non-tuberculous cases. It also shows that calcification was absent in the first stage of the disease and increased in frequency with advance in the disease; however, only in the third stage cases did the percentage of positive cases exceed that found in the non-tuberculous cases. It might be mentioned that the patients comprising the third stage group were slightly older than those comprising the non-tuberculous group.

From these tables we may conclude that calcification of the rib cartilages, especially the first, is more common in males than in females, that it increases in frequency with advancing years and finally, that its incidence in pulmonary tuberculosis is only accidental, or a late secondary change, and that its occurrence is of no diagnostic significance whatever in the individual case.

The size of the aortic shadow was studied in relation to the size of the heart but nothing of importance in regard to the diagnosis of pulmonary tuberculosis was determined.

TABLE VIII

SHOWING THE ABSENCE OF ANY RELATION BETWEEN THE WIDTH OF THE 2ND INTERSPACE AND PULMONARY TUBERCULOSIS.

Stage of Disease	No. of Cases	Width of 2nd Interspace Average	 Max.	 Min.
Neg.	36	3.0 cm.	4.4 cm.	1.5 cm.
Doubt.	35	2.7 cm.	4. cm.	1.8 cm.
I Stage	9	2.9 cm.	3.8 cm.	2.2 cm.
II Stage A	37	2.9 cm.	4.5 cm.	2. cm.
II Stage B	16	3.3 cm.	4. cm.	2.5 cm.
III Stage	20	2.8 cm.	4. cm.	1.8 cm.

Another sign to which attention is sometimes called is the presence of narrow interspaces in individuals suffering from pulmonary tuberculosis. The width of the 2nd interspace in the left midclavicular line was measured and the results recorded in table VIII. From this it is seen that no apparent relation exists between the width of this interspace and the presence or absence of pulmonary infection. Whether we may take the width of the 2nd interspace as a basis for comparison is, however, open to argument.

TABLE IX

Showing the Absence of Any Relation Between the Angle of the 6th Rib and Pulmonary Tuberculosis.

Stages of Disease	No. of Cases	Angle of 6th Rib Average	Max.	Min.
Neg.	36	100°	104	85
Doubt.	35	97°	103	99
I Stage	9	101°	105	97
II Stage A	37	99°	104	97
II Stage B	16	100°	103	80
III Stage	22	97°	109	85

No very absolute measurements could be made of the angle of the ribs, but in table IX we have recorded the average angle made by the spine and the sixth rib on the left side. Apparently no relation exists between this angle and pulmonary tuberculosis.

The position in which our cases were radiographed made it impossible to study the shape of the upper aperture and alterations in the angles of the neck muscles.

No definite conclusions were reached from our study of the height of the diaphragm, since the average height was about the same in the tuberculous and non-tuberculous cases and the variation in individual cases was very great. There are, however, several interesting features about the diaphragm shadow, especially the occurrence of irregularities, which are worthy of more extended consideration, especially in connection with post mortem examinations.

In conclusion, we believe we are justified in saying that these signs—small pendulous heart, calcified cartilages, narrow interspaces, and excessive sloping of the ribs—are not only valueless, but are absolutely misleading, if considered as positive signs in the radiographic diagnosis of pulmonary tuberculosis.

EXPERIMENTAL STUDIES ON TUBERCULO-PROTEIN HYPERSENSITIVENESS AND THEIR POSSIBLE APPLICATIONS.[1]

By Allen K. Krause, M. D., Saranac Lake, N. Y.

It gives me great pleasure to appear before the Laennec Society as an envoy of the laboratory whose founder, Dr. Edward L. Trudeau, has so often acknowledged his indebtedness to the men of the Johns Hopkins Medical School, who by their generous advice and assistance contributed in no small measure to the success of his work at Saranac Lake.

Ever since Koch's discovery of tuberculin it has been universally taught and believed that the tuberculous animal differs fundamentally from the non-tuberculous animal in its response to injections of derivatives of the tubercle bacillus. The tuberculous animal becomes acutely ill several hours after a subcutaneous injection of tuberculin: it suffers from weakness and prostration and a rise of temperature, and at the same time there are evidences, such as increased cough and expectoration in pulmonary disease, or swelling, pain and redness in joint or glandular involvement, that there is an exacerbation of the disease at the focus. Besides this, at the site of injection there is frequently an area of redness, swelling and pain. The tuberculous animal is therefore found to react to tuberculin in three different ways, to which the terms general, focal, and local or puncture reactions have been applied. It was also discovered by Babes and Proca that if tubercles were induced in an animal by the intravenous injection of dead tubercle bacilli, such animals would likewise react to tuberculin with general, focal, and local signs and symptoms. The general reaction is in both instances considered to be some kind of an intoxication, while the focal and local reactions are forms of inflammation.

Such animals were therefore said to be specifically sensitive to tuberculin; and, as our knowledge of the products of the bacillus extended, it was found that practically every preparation that contained bacillary protein could bring about reactions in animals that harbored tubercles set up by living or dead bacilli. Bacillary emulsion, T. O., T. R., water extract, bacillary filtrate, precipitated tuberculin and a host of other preparations were all like old tuberculin in that extremely small amounts of them rendered the animals ill.

At the same time it was noted that healthy, non-tuberculous animals could sustain relatively enormous doses of tuberculin and tuberculo-derivatives without harm. Although some workers, particularly Landmann, by methods of concentration succeeded in obtaining from tubercle bacilli products that would poison the healthy animal in moderate amounts, still the non-tuberculous always resisted much larger doses of any given preparation than the tuberculous. The healthy animal was accordingly considered to be insensitive to tuberculin and its related products. More than this, the claim was generally made that the animal without specific tubercles could not in any way be made sensitive to tuberculo-protein. Only within the last year no less an authority than Hamburger has come to this conclusion, and within the past two or three months Kraus, Loewenstein and Volk have supported his contention on experimental evidence, while Wassermann, Pappenheim and von Pirquet have recently voiced the same assumption.

Since every theory that has tried to explain the so-called tuberculin reaction is based on evidence that has denied the possibility of sensitizing non-tuberculous animals with derivatives of the bacillus, Baldwin's announcement, made a year ago, that he had succeeded in doing just this thing was of the greatest importance. It is this work and further tuberculosis that I wish to go over with you night.

---

[1] Address delivered before the Laennec Society, Johns Hopkins Hospital, April 24, 1911.

Three years before Baldwin, in 1907, Rosenau and Ander- 1 had intoxicated previously sensitized guinea-pigs with an tract of human tubercle bacilli, so that after a subcutaneous intraperitoneal injection a few of their animals showed ld symptoms of illness that consisted of restlessness, atching the nose, irregular respiration, tremor and weak- ss. They did not follow up this work with further experi- ntation.

Baldwin sensitized guinea-pigs by the ordinary methods intraperitoneal or subcutaneous injections of a derivative the tubercle bacillus. As a rule his preparation was a ter-extract-filtrate of the micro-organisms. He obtained s by digesting at 50° C. in distilled water the powder de- ed from thoroughly washed, dried, pulverized cultures, that l been grown in broth media. After extracting the powder a day or two, he filtered the supernatant extract-emulsion ough a Berkefeld bougie. The filtrate was a material that s freed from bacilli and which very likely contained no er organic constituents except bacillary proteins. Since organisms were very carefully washed when they were arated from the culture media it is hardly possible that any tein constituents of the broth were carried over with the illi except in very negligible quantity. By using this ma- ial the contingency of a broth protein sensitization was ided, and the results of the subsequent experiments could interpreted as being due to the effect of bacillary protein.

If now a normal animal was treated with a single dose of a all amount of such a water-extract it was found that two three weeks later it would respond to a second or toxic ection of bacillary protein with all the symptoms of acute phylaxis, dying as a rule in from three to six minutes. The terial that was used for this second or toxic injection was ally the unfiltered, supernatant extract-emulsion which I e already mentioned. This is the product which Koch cribed at T. O. It is an extract of the bacilli, and, since contains the ground-up bodies of the organisms, it is an ilsion as well: we have for this reason usually designated s extract-emulsion in our work.

lthough Baldwin and I found that a small amount of tu- ulo-protein would sensitize an animal if it was introduced lmost any parenteral route, it soon appeared that not every was available for the second injection if toxic symptoms to be elicited. Baldwin practised toxic injections by of the peritoneum and subcutaneous tissue without result, on account of operative shock he got obscure or question- results with intracerebral and intracardial injections. By g the postorbital method of injection, which had been al- y described by Gay and Southard, he succeeded in pro- ng acute anaphylaxis almost invariably in sensitized ani- . The symptoms were sharp and definite. For a minute following the injection the animal was apparently well normal. It then began to scratch its nose, to cough nodically, and to go through "bucking" movements. and in a very few minutes the animal was dead. Respiratory distress dominated the picture throughout the attack. At first deep and labored and perceptibly slowed, the thoracic excursions became greater and greater and more and more delayed, until approaching death was signalized by a few tremendous inspirations which toward the end were as much as thirty or forty-five seconds apart. There was no mistaking the character of the symptoms. They were an exact replica of what had been so often described as the anaphylactic shock caused by other proteins. Nor were the pathological findings any less typical. All the animals, that died in this way, had the large, white, blown-out lungs that Auer and Lewis had proved to be characteristic, the pathological anatomy of which has so recently been worked out by Schultz and Jordan. The epicardial hemorrhages to which attention was called by Gay and Southard were also a constant feature.

The amounts that Baldwin usually used were one or two cubic centimeters of water extract intraperitoneally to sensitize a full-grown guinea-pig, and one-half to one cubic centimeter of extract-emulsion postorbitally to intoxicate it fatally. I found later that I could satisfactorily sensitize an animal with 0.01 cc. water extract given intradermically, bring on fatal anaphylaxis with 0.05 cc. extract-emulsion postorbitally, and cause symptoms with 0.03 cc. extract-emulsion postorbitally. The last named quantities are represented by 0.05 mg., 0.9 mg. and 1.6 mg. dry weight respectively.

Such experiments showed us at once that we had succeeded in putting non-tuberculous animals in such a condition that in one respect they resembled tuberculous guinea-pigs: that is, that a fraction of a milligram of tuberculo-protein would make them violently ill. Let us see how the similarity worked out after further experimentation. Let us remember too, that up to this point our information comprised the following facts: the normal, non-tuberculous animal can tolerate the injection of large amounts of our tuberculo-preparations—1.0 cc. extract-emulsion postorbitally, at least 5.0 cc. intravenously, and at least 10 or 15 cc. intraperitoneally without effect; less than a milligram postorbitally will bring about an acute and fatal intoxication in a sensitized non-tuberculous animal; and a fraction of a milligram, introduced subcutaneously or intraperitoneally, will kill a tuberculous guinea-pig with a focal and general reaction that comes on several hours after the injection of the antigen.

I have said that Baldwin failed to poison sensitized guinea-pigs by intraperitoneal injections. As a general thing it is impossible to do so, but in a few very highly sensitive animals I have succeeded in inducing symptoms of illness. I used moderate-sized toxic doses. A citation of a couple of the experiments will show what occurred.

ANIMAL 1.—Sensitized 82 days previously. Injected intraperitoneally with 1.5 cc. E. E. 161.

Result.—The animal seems normal and runs around for about 10 minutes after the injection. Then symptoms of illness begin to develop rapidly. It drags its hind legs, becomes very weak and lies down on its side. These symptoms continue for 10 minutes,

when they begin to subside. Within a half hour after the injection the animal has almost regained its normal condition.

ANIMAL 2.—Sensitized 126 days previously. Injected intraperitoneally with 2.5 cc. E. E. 161.

***Result.*—No symptoms for 10 minutes. Then the animal becomes weak and staggers around on the floor. The respiration is slow and labored with marked heaving of the chest. The animal slowly recovers from the symptoms.**

Here in certain selected animals I get symptoms of illness from an intraperitoneal injection. The fundamental character of the reaction must be the same as that which occurs when I inject postorbitally. But the reaction expresses itself differently. In the latter case, there is a fulminant process that ends in death in a very few minutes; in the former, there is a prolonged chain of symptoms that come on gradually, are much less severe and terminate in recovery. If, now, I make an intravenous, toxic injection on a sensitized animal, I find that it will have the same result as a postorbital one. If, however, I inject subcutaneously, I elicit no symptoms. I am taught, therefore, that given a sensitive animal, the nature of its response to a toxic injection of tuberculo-protein will depend altogether on my method of introducing the antigen. If the preparation enters the body in such a way that it will get into the circulation rapidly, acute and fatal anaphylaxis will result. If it is absorbed more slowly, there will either be no symptoms or the symptoms will tend to approximate the comparatively gradual illness that occurs when we inject the tuberculous animal subcutaneously. It further seems as though we have to do with an antibody that is present in the circulation which reacts with the antigen to set free a powerful toxin—the so-called anaphylotoxin of Friedberger. In further support of this idea that the antibody that is concerned in the production of the acute anaphylaxis is free in the circulation, is the circumstance that in some forms of protein anaphylaxis, the serum of a sensitized animal will render a second animal sensitive to the particular protein if transferred to the latter.

After demonstrating that the non-tuberculous animal that had been treated with tuberculo-protein was unlike the normal animal but similar to the tuberculous animal in that it would react to very small amounts of this antigen, Baldwin showed further that a large proportion of tuberculous animals that had never before received tuberculo-protein would react to it exactly like the sensitized animals that were not tuberculous. If he injected such tuberculous animals subcutaneously or intraperitoneally with extract-emulsion, they would suffer the well-known general tuberculin reaction, which manifested itself several hours later and ended in death if the dose was sufficiently large. If, however, he introduced his extract-emulsion postorbitally, many of these tuberculous animals would die in a few minutes of acute anaphylaxis and would show the typical lesions of the heart and lungs. Not all tuberculous animals, picked at random, will react in this way and the reason why they differ from one another is not yet clear, but probably depends upon the nature and extent of the tuberculous foci, the conditions of absorption from them, and the animals' inherent ability to create antibodies. But after injecting say fifteen tuberculous guinea-pigs of one lot, I have had sixty per cent show acute anaphylaxis.

This event brought out plainly that all that was necessary to prove one point of similarity between tuberculous guinea-pigs and sensitized, non-tuberculous ones was to treat each kind with a toxic dose of antigen postorbitally—that is, in a rapidly absorbable way. The first logical deduction was that the tuberculous animal had a circulating anaphylactic antibody; another, that it was identical with that of the sensitized, non-tuberculous animal; a third, that it was produced in response to the same antigen as in the latter; and a fourth that the antigen arose in the tuberculous focus and was probably the tubercle bacillus.

* * * * * * * * *

After these relations had been worked out the first problem that naturally suggested itself was to find out what would happen to a non-tuberculous animal if it were treated with tuberculo-protein like tuberculous animals that are undergoing tuberculin therapy. The specific treatment of tuberculosis after a long period of disuse and even disrepute has of late years been gradually coming into its own again. Clinician after clinician is now taking up the method, and the majority of capable observers are reporting strikingly good results in many cases. However, the action of the bacillary preparations so far as their therapeutic uses are concerned still remains as mysterious as ever. Their application thus far has been purely empirical and limited only by the clinical judgment of the practitioner. The general opinion of the latter has been, I believe, that the introduction of carefully graded doses rouses the tuberculous organism to the over-production of defensive substances—antibodies—that neutralize the poisons elaborated in the focus or attack the bacilli themselves or perform both of these functions.

The idea that the bacillary products that are ordinarily used contain primary toxins, does not seem tenable. If we had to do with such toxins, they should poison the normal, non-tuberculous as well as the tuberculous animal. But we have seen that extremely large doses are without untoward effect on the normal animals. If there are toxins, too, they should stimulate the animal organism to the production of antitoxin in amounts directly proportional to the quantity of tuberculo-protein introduced. As a matter of fact, no one has ever succeeded beyond dispute in producing an antitoxin to any derivative of the bacillus.

But how the picture changes when we consider animals that have already absorbed antigen! If an animal be infected experimentally it begins to react to tuberculin on or about the fifteenth day; in like manner, the non-tuberculous animal treated with protein will react to a second injection given about two weeks after the first. Both classes of animals will then be made violently ill by exceedingly small doses of the protein. What other explanation can we have but that in both there have been produced antibodies that react with antigen to set free a poison—the anaphylactic poison?

symptoms of e disease—the weakness, the anorexia, the tachycardia, the iaciation, the fever that are so often observed. Indeed it is ore rational, in the light of our present knowledge, to asibe these to the continual absorption of antigen by an alady sensitized system. If an extract of the entire contents several tubes of cultures of tubercle bacilli will not make normal animal the least bit ill, why should the products of mparatively few bacilli, as many as would be enclosed in a bercle the size of a walnut, bring about so severe an intoxition of an animal? It is hard to explain this on the toxin ea, but the conception of hypersensitiveness makes it much earer.

The method of tuberculin therapy that is in most common e to-day is that of treating the individual with small doses d gradually raising them until the patient can tolerate quite ge amounts without reaction. Every therapeutist comes to ilize that there is no exact guide in this treatment and that sole index in proceeding with tuberculin injections is the inner in which the patient responds to them. He finds that cannot even predict which particular case will do well and iich one will lose ground under treatment. He learns that far as the results are concerned each individual patient is aw to himself; and that, if the latter holds his ground or proves, it is probably safe to continue with tuberculin, but his health retrogrades it is better to discontinue it. Out the tremendous mass of conflicting evidence that clinicians ve given us, I think that several generalizations can fairly made. These are that the chronic, afebrile case, who is in od condition and whose disease is not too far advanced, is most favorable case for treatment; that such a patient's idition is often improved by tuberculin therapy after he long ceased to show improvement under the other wellown methods of treatment; that those patients do best who tolerate relatively large amounts of tuberculin, and consely, those patients can best tolerate tuberculin who are st free from symptoms of their disease; and that in many es the patient's tolerance to tuberculin is apparently greatly reased by spaced, gradually increasing doses of the antigen. d it is this latter principle—to diminish hypersensitiveness its consequent intoxication—that has perhaps been the ling aim in therapy.

therefore attempted to imitate the conditions of tubern therapy on non-tuberculous animals and to follow the ilts so far as sensitiveness was concerned. I wished to find whether I could render them tolerant or immune to tuulo-protein. In the experiment I used thirty-six normal iea-pigs, which I divided into three sets of twelve each. h set received spaced, gradually increasing amounts of r-extract at various intervals of time—one set every two , another every four days, and a third every seven days. r they had reached fairly high dosage the animals were ved to go without treatment for from seven to sixteen , when they were given postorbital injections of extractlsion. The animals that were treated every two days nine days were getting 5 cc. intraperitoneally; those treated every four days began with 0.25 cc. subcutaneously and ended on the thirty-ninth day with 4 cc. intraperitoneally; those treated every seven days began with 0.25 cc. subcutaneously and ended on the thirty-ninth day with 4 cc. intraperitoneally. The first set received a total of 25 cc. W. E. in seventeen doses; the second, a total of 13 cc. in ten doses; the third, a total of 8 cc. in six doses. Seven days after treatment stopped, I tested several members of each series postorbitally, and again sixteen days afterwards. All of the animals except one were very sensitive to the ordinary toxic doses for sensitized guinea-pigs (0.75 cc. E. E.), while most of them reacted strongly to very small doses (0.15 cc. to 0.3 cc.). The general result was to indicate that after repeated doses sensitiveness was much greater than after single injections. There was no evidence that tuberculo-protein toleration could be obtained in non-tuberculous animals by repeated dosing,—there was, at least, no noticeable tolerance seven days after treatment stopped. A further endeavor was then made to discover whether there was any tolerance whatever for a very short time after regular treatment with the protein. I therefore repeated the experiment I have just cited, making the toxic, postorbital injection three days after the last subcutaneous treatment. I thus tested four animals and found them all sensitive, three of them fatally so. I have since treated many animals with more than a single sensitizing injection and have found that the best way to attain a very high degree of sensitiveness is to give them repeated injections of antigen—and that the larger the individual doses of antigen, the greater the degree of sensitiveness.

These experiments led to two conclusions; namely, first, once sensitiveness to tuberculo-protein is acquired by a non-tuberculous animal, the repeated absorption of protein tends only to increase this condition; and second, tolerance to tuberculo-protein cannot be attained in these animals by gradually raising the dosage or diminishing the intervals of time between doses. Other experiments, which I shall cite later, showed that perceptible sensitiveness persists for a long time after a single injection—often for more than a year—but that there is a tendency for it to diminish as time goes on unless it is renewed by further applications of antigen.

The results of the experiments which I have just described do not seem to square with the clinical idea of the method of gaining tolerance in the tuberculous, and it is this contradiction to which we must now address ourselves. As the first step, let us examine the nature of the different forms of sensitiveness as they exist in the tuberculous organism.

If we treat the skin with a derivative of the tubercle bacillus either by applying the latter to a break in the surface or injecting it between the layers of the skin, we find that some hours afterwards an inflammation will occur at the site of or in the immediate neighborhood of the injection. All of our present knowledge indicates that this inflammation is the ultimate result of an interaction between the injected antigen and antibodies that are present at the point of injection, and that these antibodies are produced by the diseased organism in response to antigen that has arisen from the tuberculous focus. According to von Pirquet's view all of the cells of the body take part in this response to stimulation by antigen. At the Saranac laboratory we have never been able to elicit a skin reaction in guinea-pigs unless the animal has tubercles caused by living or dead bacilli; that is, a first injection of extracted protein will not sensitize to a later skin reaction. Moss, however, has found that individuals sensitized with horse serum acquire a skin sensitiveness to the serum. The possibility of sensitizing the skin by injecting an animal with pure tuberculo-protein is therefore not so remote if we once hit upon the proper conditions; and we are still working along this line.

If a small amount of tuberculo-protein enters the body subcutaneously or intraperitoneally or even intravenously (provided in the last instance that not too much anaphylactic antibody is present in the circulation) the tuberculous focus will suffer a reaction. This reaction also comes on several hours after the injection and expresses itself symptomatically by evidences of increased activity of the disease process, such as cough and expectoration in pulmonary tuberculosis, and anatomically by inflammation. As in the skin reactions, this inflammation is also most likely the end result of the union of antigen and anaphylactic antibody at the focus. Now the inflammation of the focus introduces a factor altogether different from any that can exist in the sensitized, non-tuberculous animal. By bringing about circulatory changes and softening the focus it renders the absorption of the focal material much easier than it was before. This focal material thrown rapidly into the circulation then reacts on an organism that has already been sensitized to it during the course of the disease and brings about an acute type of illness, the so-called general fever reaction, the manifestations of which are not at all unlike those met with in any acute exacerbation of the disease. Indeed, there is great similarity between what occurs during the general reaction and the course of events in ordinary acute tuberculosis. In both there are signs and symptoms of increased inflammatory focal changes: in both, the symptoms are very much alike. I have already said that the conception that the symptoms of tuberculosis are due to the absorption of focal material is more reasonable than the primary toxin idea; and it is evidence such as this that leads me to think that the general reaction is a phenomenon that depends upon what happens at the focus after a tuberculin injection. I am at the present time engaged in experiments in an attempt to discover what the sensitizing material of the focus is: whether it is the bacilli or the necrotic material or a substance that is formed by the effect of one acting on the other. My results are still very incomplete, but I may say here that I have not been able to confirm Kraus and Volk's observation that extracts of focal material are primarily toxic for guinea-pigs while those of normal organs are not.

Besides these three forms of reaction there is the so-called puncture reaction, which is essentially a local reaction and similar to the skin reactions, and the acute anaphylactic reaction, which [illegible] already discussed.

Let us take such a tuberculous animal with local, focal and what I may call acute anaphylactic sensitiveness and wander into more or less hypothetical ground. If we should inject it subcutaneously with tuberculin we might get a puncture reaction and no other perceptible response to the injection. Here I should say that at the point of injection there was enough anaphylactic antibody present to bind all or most of the antigen, so that if there was a residuum of the latter it was not enough to combine with sufficient antibody to cause reaction elsewhere. Most of the protein would be neutralized, as it were, at the surface of the body. If, however, the peripheral antibody were absent, or small in amount, or if the doses were considerably larger than what the peripheral antibody could take care of, the antigen would get into the circulation. Here it would meet with circulating anaphylactic antibody if the latter were present. The acute anaphylactic shock would not result, however, because on account of slow absorption the units of antigen would be picked up one by one, and we have already seen that the fulminant symptoms are only brought on when we introduce the antigen in such a manner that it gets into the circulation very rapidly. Whatever antigen is bound by circulating anaphylactic antibody becomes incapable of reacting with the anaphylactic antibody in the focus and thus the focus is protected to a degree that is directly proportional to the amount of circulating antibody that exists at any one time. We should have here a very unusual condition. The circulating anaphylactic antibody would be a great menace to an animal if the antigen were injected intravenously, but it is just as great a bulwark against focal and general reactions if the antigen is so injected that absorption is slow. With the combination proceeding gradually unit by unit all the circulating antibody is used up without the production of symptoms, and the only way that the focus will be affected will be by the unbound residual antigen. Thus we should have two zones of defense, which I may call peripheral and circulating zones; and the contingency of a focal reaction would depend upon quantitative relations between peripheral and circulating antibody and antigen, as well as upon time relations that would govern the binding of the two opposing substances, which in turn would depend largely upon the method of injection and the degree of solubility of the antigen that is employed. I have approached this matter of absorption experimentally in the following manner. I first injected sensitized, non-tuberculous guinea-pigs with very large doses of extract-emulsion intraperitoneally and followed this up some time later with a post-orbital injection. When the second injection had been given some time (one-half to one hour and a half) after the first injection it very often failed to bring on the anaphylactic symptoms, showing that the circulating antibody had disappeared. These observations have been sufficiently controlled to be of some value, and I have experiments now under way in which I am trying to establish the time relations more definitely.

But there is a third defensive zone with which we have to do. This is of a mechanical nature and is comprised in the extent of fibrosis that any given tuberculous focus has undergone.

more successfully than if no such protection exists. As healing occurs, and more and more scarring takes place, and the tubercle becomes less and less vascular, it certainly must happen that less extraneous matter can be carried into the tubercle. This factor must surely be of prime importance in many cases. We know that as a general thing the longer a given case has been healed and the more completely a lesion has been closed in, the larger our dose of tuberculin must be to induce reactions. There are some exceptions to this rule but I believe the generalization can safely be made. Now the non-tuberculous animal, once sensitized, gradually loses this condition unless we nject more antigen—in other words, its circulating antibody diminishes in amount. The case that has been healed for a long time would so far be comparable to the former. We should assume, therefore, that it had less circulating anaphylactic antibody to protect its old focus. The tubercle, however, has a more or less efficient protection of its own, namely, its fibrous capsule.

We now begin tuberculin therapy with a tuberculous animal, such as we have been considering. If the tissues of the tuberculous animal respond to injections of tuberculo-protein like those of the non-tuberculous animal—and I see no reason why they should not—they will gradually heap up anaphylactic antibody in the circulation. If there is very little of this antibody to begin with, or if the focus is naked, as it were, with but slight fibrosis, we have manifestly a more delicate task ahead of us than if the reverse is the case. We can conceive of several possible conditions of the patient at the time he starts treatment. He may have much circulating antibody with a well invested tuberculosis, or much circulating antibody with more or less softened tubercles, or little circulating antibody combined with either focal condition. It is therefore not hard to foresee how every case may respond in its own way to tuberculin. But if we have a favorable case to begin with, the tendency would be, as stated, to stimulate the organism to the production of circulating antibody, which, as we ave assumed, protects the focus against subsequent doses of ntigen and is one of the factors in the so-called acquired olerance after treatment. I now have experiments under way o test the validity of this hypothesis. By repeated doses of ntigen I sensitized normal animals to a high degree. I have ately rendered these sensitive animals tuberculous, together ith normal, non-sensitive control animals. In a couple f months, after the disease is well established, I shall give oth sets lethal doses of tuberculo-protein subcutaneously, or traperitoneally. If my hypothesis is correct I shall expect find the initially non-sensitive animals reacting focally to maller doses than those that were sensitized before inoc-ation.

The other factor in the production of tolerance in therapy ould enter in the direct action of the tuberculo-protein on e focus itself. Since we know that tuberculo-protein in-mes the tubercle, it is more than likely that the end result every dose that reaches the tubercle, no matter how small,

sient hyperæmia to the most intense inflammation of the focus. It seems quite reasonable that slight inflammations could be of real service in assisting the healing process of the tubercle and many clinical observations, which it is unnecessary to go into here, support this view. Certainly by the increased stimulation of fibrous reaction the scarring process would be hastened. The amount of tuberculo-protein which would react with the focus would depend upon the conditions that I have already mentioned. With a good defense of circulating antibody the focus would pick out only the residual tuberculo-protein and would be saved from the dangers of too violent a reaction—the excessive inflammation and a dissemination of the disease that might result were the tubercle subjected to all the protein of a given dose. Hyperæmia and inflammations during the course of treatment might be so slight as to be imperceptible, yet their end effects—the resultant focal sclerosis—might be marked. And as the focus gradually becomes closed in during the healing process, the third zone of defense that we have considered would become strengthened and assist appreciably in producing tolerance to the antigen.

I think that you have already become impressed by the fact that the problems of the tuberculin reaction and of tuberculin therapy are extremely complicated ones and that any adequate theories of them must take into consideration a great many factors. In the above recital I have tried to do no more than elaborate a working hypothesis that is based on well authenticated clinical observations and on experimental work that has been carried on at the Saranac laboratory. I have tried to separate what has been demonstrated from what remains yet to be proved before these conceptions can be lifted from the realms of hypothesis to those of theory. And if I have been successful in suggesting fruitful paths of experimentation I shall be more than satisfied.

* * * * * * * * *

A problem of the first importance is what relation the hypersensitiveness to the products of a given microörganism bears to susceptibility to infection from it. It has long been known that during the course of an infection the diseased individual becomes sensitive to the organic products of the infecting agent, but thus far we have had practically no experimental information concerning the part that the sensitive state plays in the defensive processes of the organism against bacillary implantation. It was our problem, therefore, to discover whether the tuberculo-protein sensitized animal acquired increased or lowered resistance to infection by the tubercle bacillus.

I accordingly undertook experiments in which I aimed, first, to sensitize normal animals; next, to inoculate these together with normal, non-sensitive controls; and finally, to sacrifice the whole number after the tuberculosis was well established and compare the progress of the disease in the initially sensitive animals with that in the control animals. The animals that I sensitized before inoculation comprised forty-two guinea-pigs which were divided into four sets. The members of set A received a subcutaneous or intraperitoneal injection of water-extract every two days over a period of thirty-nine days in which they got a total of 25 cc. Those of set B were similarly treated every four days and received a total of 13 cc. in the thirty-nine days. Each animal of set C, treated every seven days, had in all 8 cc. during the thirty-nine days. The individuals of set D were given only one sensitizing injection,—1.25 cc. of water-extract intraperitoneally. There were originally twelve animals in set A, twelve in set B, twelve in set C and six in set D. Sixteen days after the preliminary treatment of sets A, B and C ended, I tested individuals from each lot and found that a high degree of sensitiveness to extract-emulsion existed in all of the tested animals. At the same time I gave two members of each set A, B and C sublethal doses. These last named animals all showed severe anaphylactic symptoms but did not die. I did not test the animals of set D, because I had sensitized animals in a similar manner many times previously and had always found them hypersensitive.

I was now ready for my inoculation. For this purpose I took six animals, that were sensitive but had not been tested, from each of the sets, A, B, C, and D; two from each of the sets A, B, and C that had received a toxic postorbital injection an hour before, had shown symptoms but had to a certain extent recovered from them; and six normal non-sensitized animals as controls. I thus had six different lots for inoculation, made up as follows: Lot 1, six guinea-pigs that had been sensitized, then given sub-lethal toxic injections, and were more or less intoxicated at the time of inoculation. These animals were in a refractory condition to further immediate injections of protein, since their first non-lethal toxic injection protected them against a second. Lot 2, six guinea-pigs, sensitized by treatment every two days, and not given toxic injections. Lot 3, six guinea-pigs, sensitized by treatment every four days, not given toxic injections. Lot 4, six guinea-pigs, sensitized by treatment every seven days, not given toxic injections. Lot 5, six guinea-pigs, sensitized by one injection thirty-seven days before inoculation. Lot 6, six normal untreated guinea-pigs.

I injected each of the above animals in the same spot subcutaneously in the right groin with one-tenth of a cubic centimeter of an emulsion of human tubercle bacilli prepared as follows: Several spadefuls of a beef serum culture were rubbed up in a mortar with a minimal amount of physiological salt solution until the mixture was a fairly homogeneous paste. This was then diluted and centrifugalized several times. The supernatant emulsion was pipetted off, further diluted and again centrifugalized. The resultant supernatant emulsion was then filtered several times through cotton. This filtrate was the final emulsion that was used for inoculation. Examination of the filtrate showed no clumps and an average of but one tubercle bacillus to every one or two fields of the oil immersion lens. Before inoculating each animal the beaker containing the stock emulsion was given the same number of whirls to ensure an even mixture and but one-tenth of a cubic centimeter was withdrawn at any one time.

Sixty-two days afterwards the animals were killed and their condition noted. The results of the inoculation can be summarized as follows:[2]

Refractory Animals, 5 guinea pigs.—Total weight at time of inoculation, 1795 grams; average weight, 369 grams; total weight 62 days later, 2200 grams; average weight, 440 grams; average net gain, 81 grams. None pregnant. There is advanced tuberculosis in all. The lungs and spleen are involved in every animal and the liver in two.

Sensitized Animals, treated every 2 days, 6 guinea pigs.—Total weight at time of inoculation, 2265 grams; average weight, 377 grams; total weight, 62 days later, 2690 grams; average weight 448 grams; average net gain, 71 grams. Three were pregnant. The disease has reached the spleen in only one of the six and has advanced no further in any.

Sensitized Animals, treated every four days, 6 guinea pigs.—Total weight at time of inoculation, 2100 grams; average weight 350 grams; total weight, 62 days later, 2650 grams; average weight, 442 grams; average net gain, 92 grams. Two were pregnant, one of which littered 31 days after inoculation. The spleen is involved in three of the six guinea pigs. The process has affected other viscera in only one which was pregnant and in which the lungs were diseased.

Sensitized Animals, treated every 7 days, 6 guinea pigs.—Total weight at time of inoculation, 2185 grams; average weight, 364 grams; total weight, 62 days later, 2950 grams; average weight 492 grams; average net gain, 128 grams. Two were pregnant. The spleen was involved in three, and the lungs in two of these three.

Sensitized Animals, given only one dose, 6 guinea pigs.—Total weight at time of inoculation, 2140 grams; average weight, 357 grams; total weight, 62 days later, 2680 grams; average weight 447 grams; average net gain, 90 grams. One was pregnant. The spleen was diseased in every animal and the lungs in two.

Control, Non-sensitized Animals, 6 guinea pigs, 5 autopsied.—Total weight at time of inoculation, 2180 grams; average weight 436 grams; total weight 62 days later, 2830 grams; average weight, 566 grams; average net gain, 130 grams. None were pregnant. The spleen was involved in four of the five animals and the lungs in two.

So far as known, all of the pregnant animals became pregnant after inoculation. Macroscopic tuberculosis is meant in the above descriptions when an organ is said to be involved.

The refractory animals suffered most. The disease was pretty well disseminated in all of these and they exhibited far more tuberculosis than any of the animals that had not been intoxicated and than any of the controls. It will be remembered that these refractory animals were given toxic injections about an hour before inoculation. The widespread extent of the process was very likely due to the fact that the bacilli were implanted in animals that were still more or less poisoned at the moment of infection. And it would appear that the animal organism is less resistant to infection than normal during the period that it is undergoing symptoms of anaphylaxis or before it has completely recovered from their effects. Whether this event is specific or whether toxicity from one bacterio-protein would fail to render an animal more susceptible to infection by another microörganism is a matter that has not yet been determined. We know that some infectious diseases undoubtedly increase the susceptibility to tuberculosis: or, at any rate, that tuberculosis often actively be interesting and important to find out whether this diminished resistance to tuberculosis is due to the intoxication that is brought about by hypersensitiveness to another bacterio-protein, and I am now trying to solve this problem by experimentation.

---

[2] Details of these experiments are to be found in an article in the Journal of Medical Research, 1911, XXIV, 2, 361.

The animals that were sensitized in various ways all became diseased. As a general thing, we may say that the more protein the animal received during preliminary treatment, the less the resultant infection. So far as I could tell from the toxic symptoms of the tested animals, there was very little difference in the average degree of sensitization between members of the several sets. Nevertheless, the reaction is a gross one and the mere fact that animals from three different series reacted fatally does not imply that their degree of sensitization is the same. You will easily see that if one thousand antibody units, say, or 0.3 cc. of antigen, were enough to produce death in a given guinea-pig, then ten thousand antibody units or 0.5 cc. of antigen would bring about the same result in another guinea-pig. Both die but are not equally sensitive, for guinea-pig B would have ten times as much antibody as guinea-pig A. We can, however, determine the degree of sensitiveness by graduating the dose of antigen which would be the constant. The guinea-pig would be the variable and its symptoms in response to a fixed, moderate dose of antigen would determine its sensitiveness. Unfortunately in these experiments I did not have enough animals to determine these variations. Since the preparation of an article that has lately been published and in which I assumed that the animals of the different series were probably equally sensitive, I have had occasion to deduce from a number of experiments that sensitiveness does fluctuate—tending to die out, though very slowly indeed, if the antigen is not renewed and being markedly increased by repeated injections. I am glad therefore to take this opportunity to qualify my former assumption and point ut its fallacy.

However, it is very likely that the differences of tuberculous nvolvement were altogether independent of any degree of aised or lowered resistance conferred by the sensitive state, ut that they were due to a heightened immunity that followed he protein injections and was brought about by other unnown factors. The changes that occurred in those guinea-igs that had only one sensitizing dose support this view. hese were inoculated thirty-seven days after sensitization. xperiments covering a period of two years have shown us hat thirty-seven days after an intraperitoneal injection of .25 cc. of water extract, a guinea-pig is almost invariably atally sensitive. So we are pretty safe in assuming that at e time of inoculation these were highly sensitive. Yet these one dose” animals suffered in just about the same measure did the controls. The one dose of water-extract was not fficient to make them immune to infection. But it was ough to sensitize them, and while sensitive they contracted out as much tuberculosis as did the normal animals. This idence would therefore strengthen the opinion that sensization to a bacterio-protein of itself does not convey imunity to infection, and also that hypersensitiveness and infection experiment also shows definitely that they can exist side by side in the same animal.

But we must remember that in our experiments we have very likely introduced into the animal body relatively large amounts of the infecting agent compared to what is taken in under natural conditions of infection. It is conceivable that the degree of sensitiveness that would express itself by fatal anaphylaxis might confer upon the animal the capacity to get rid of ten or fifty or one hundred tubercle bacilli, numbers that probably represent the amount of infecting material that is naturally introduced more nearly than the number contained in our inoculated emulsion. The question is certainly an open one and the point must be emphasized. At the Saranac laboratory we are now employing the more exact method of Barber in our inoculation of sensitized animals. This as you know consists in counting out the living microörganisms one by one, and thus enables us to infect with any desired number from one up. By the use of this method we hope to determine definitely whether sensitization carries with it any increased resistance to infection.

* * * * * * * * *

There remains one phase of our work on sensitization which I should like to bring before you. This is the matter of the inheritance of tuberculo-protein sensitiveness. Most of you know that Rosenau and Anderson first demonstrated that sensitiveness to horse serum was transmitted from the female guinea-pig to its offspring and that the male parent has no influence in this transmission. Their work has been confirmed by Gay and Southard, Lewis, and Otto. Schenck has brought forward some evidence that serum sensitiveness may also to a slight degree be handed down from the male parent. In his work on tuberculo-protein anaphylaxis, Baldwin found that the law of maternal transmission also held good with this bacillary derivative. Guinea-pigs, the offspring of actively sensitized mothers, reacted when one or two months old.

Although Baldwin was unable to show in a few animals that the tuberculous mother, which has not been treated with tuberculo-protein, transmits sensitiveness to her young, the chances are in favor of the possibility that in some instances she actually does so. You will remember that a certain proportion of tuberculous animals react to postorbital injection of bacillary protein with acute anaphylaxis in exactly the same manner as non-tuberculous sensitized ones; and that the similarity of the reaction compelled the conclusion that the reaction is in both instances the resultant of the same factors; namely, an interaction of antigen and circulating antibody. Since therefore the non-treated tuberculous animal which will react and the treated, hypersensitive animal are in exactly the same anaphylactic condition which results from the same fundamental cause, it would seem certain that in some cases tuberculous females would bear offspring that are perceptibly sensitive. This would necessarily follow in an animal that would conceive and carry young to term during a period in which she herself had considerable circulating antibody and was very sensitive. Thus far in our laboratory we have come across no sensitive offspring of tuberculous mothers, but we are still testing all such young, in the belief that sooner or later we shall encounter a sensitive guinea-pig.

There is probably no other disease that has occasioned so much discussion in regard to hereditary influences as tuberculosis, and any addition to our knowledge on this subject further than mere surmise is manifestly important. Baldwin's discovery of the maternal transmission of tuberculo-protein hypersensitiveness is, I believe, the first satisfactory evidence of the inheritance of any specific property in relation to tuberculosis. While we do not yet know what part the hypersensitive condition to bacterial products plays in immunity—whether it protects against natural infection or lays the animal organism more open to invasion—it seemed worth while to try to find out how constantly the tuberculo-protein sensitized mother will transmit the condition, and how long the animal that is born sensitive will retain the anaphylactic state. Because, too, of the logical inference, as outlined above, that under certain conditions tuberculous mothers must confer a sensitiveness on their offspring that may be perceptible or imperceptible, I thought it well to continue Baldwin's experiments.

I tested a total of sixty-one young, giving them single post-orbital or intravenous injections of extract-emulsion. All were the offspring of presumably sensitive mothers which were not tuberculous. When they were tested they varied greatly in age as well as in the time that had elapsed between the mother's last dose of antigen and the birth of the different animals. I shall not burden you with the details of the experiments, which may be found in another publication, but shall merely state their results, which may be summed up as follows:

1. The possibility of maternal inheritance is more or less irregular and inconstant.

2. It depends largely on the degree of sensitiveness of the mother at the time of pregnancy.

3. The degree of sensitiveness of the offspring as a r varies directly with that of the mother.

4. The mother's sensitiveness is heightened by repeat applications of antigen, and, conversely, tends to die out wi time unless renewed by subsequent injections.

5. The degree of sensitiveness of the offspring according varies, depending on the time that has elapsed between t mother's last dose and the birth of the offspring.

6. The degree of sensitiveness that an animal inherits ten to diminish as it increases in age and size.

7. Guinea-pigs have been born sensitive 379 days afte their mother's last injection of antigen. They have also r mained sensitive as long as 404 days after birth, although th had never been tested before.

8. Animals of the same litter may vary greatly in the d gree of sensitiveness which they inherit.

9. The fact that a number of animals were born sensitiv over a hundred days, and several 379 days, after their mothers' last injection, is direct evidence that the transmission may b one of anaphylactic antibody and not of the antigen.

10. The transmission by inheritance is probably always mainly one of antibodies.

11. Hypersensitiveness to tuberculo-protein is most likel never handed down to the third generation. This conclusio is based on tests on nine animals, the grandchildren of sensitized females through the female line.

All this evidence concerning inheritance will probably be o more tangible value after we find out what rôle hypersensitiveness plays in infection. Meanwhile it furnishes encouragement for more experimentation in this direction.

In the above recital of experimental work performed an in the discussion of where such investigations lead, I have don little more than state the problem of tuberculo-protein hyp sensitiveness in its relation to several of the phases of tube culous infection. I thank you heartily for the forbearanc with which you have followed me, and trust that the futur will bring forth still more fruitful results than the past.

VARIATIONS IN THE LEUCOCYTE COUNT IN NORMAL RABBITS, IN RABBITS FOLLOWING THE INJECTION OF NORMAL HORSE SERUM, AND DURING A CUTANEOUS ANAPHYLACTIC REACTION.

By W. L. Moss, M. D.,
Associate in Medicine, Johns Hopkins University.

AND

G. L. Brown, M. D.,
Research Worker.

(From the Research Laboratory, The Phipps Tuberculosis Dispensary, The Johns Hopkins Hospital, Baltimore, Md.)

The observations to be reported in this paper were made in connection with some recent work of Knox, Moss and Brown (The Journal of Experimental Medicine, 1910, XII, No. 4) on a local anaphylactic reaction in rabbits. Healthy rabbits were sensitized by the intravenous injection of normal horse serum in doses of 0.1 cc. to 5 cc. After an interval of 12 days or longer their sensitiveness was tested by an intradermal injection of 0.01 cc. normal horse serum given in the skin of the abdomen. A positive reaction consists of localized inflammation and swelling, varying from 0.5 cm. t 2 cm. in diameter which appears within 24 hours and usually subsides in three or four days.

leucocyte counts underwent any haracteristic changes either following the sensitizing injec- ion or during the local anaphylactic reaction produced by the ıtradermal injection of 0.01 cc. horse serum.

A considerable number of observations have been pub- ished on changes in the leucocytes following the injection of arious antitoxic sera and during the anaphylactic reaction in uman beings, a very good summary of which appears by Bianco Bienenfeld (Jahrbuch für Kinderheilkunde und Phy- iche Erziehung, N. F., Bd. LXV, 1907). Bienenfeld's per- onal observations showed a leucopenia, immediately following he injection of large doses of serum, followed by a leuco- ytosis, which, in most cases of the serum disease, in turn gave lace to a recurrence of leucopenia. The leucopenia is as- ribed to negative chemotaxis and is characterized by a iminution of the polymorphonuclear neutrophiles. The non- ranular cells seem much more resistant to these changes than o the granular cells, since they undergo much less diminution. 'he eosinophiles are not affected. Bienenfeld states that toward he end of the leucopenia there appear many large mono- uclear and transitional cells. These are ascribed to regenera- ive processes in the blood and lead to the belief that during ıe serum disease there is destruction of leucocytes followed y regeneration; however, owing to lack of more positive roof, the author leaves the question open as to the cause of ıe leucopenia, whether it is due to non-functionating of the lood-forming organs or to a destruction of leucocytes.

Hamburger and v. Reuss (Ueber die Wirkung artfremden enuinen Eiweisses auf die Leukozyten. Zeitschrift für Biol- gie, 1910, XLVII, 24) in a large series of experiments carried ıt on rabbits found that the intravenous injection of foreign roteids is followed in about five minutes by a marked diminu- on in the number of leucocytes. An exception to this rule as found in the case of horse serum which caused practically ıe same result as the injection of homologous (rabbit) serum, amely, a hyperleucocytosis. The same result, hyperleuco- 'tosis, followed the injection of normal salt solution and in- ed simple venepuncture without any injection. The authors nsider the hypoleucocytosis following the injection of reign proteid, the result of a toxic action.

Aschenheim (Ueber Schwankungen der Leukocytenzahle ch Traumen und Injektionen. Zeitschrift für Biologie, 1910, [, 385) injected a series of rabbits with homologous and het- ologous serum and in opposition to Hamburger and v. Reuss served hypoleucocytosis following the homologous, as well as heterologous serum. Simple venepuncture, without injection any kind, was followed by hyperleucocytosis. Aschenheim s unable to refer the effect on the leucocyte count of simple ıepuncture to reflex vasomotor changes due to painful muli; since anesthesia did not prevent the occurrence of perleucocytosis. He admits, however, that his experiments re not conclusive since the sympathetic system may not have n inactive under anesthesia.

Subcutaneous injections into human beings of human serum l serum from a variety of animals, produced changes in the cocyte count which followed no definite rule.

until after many counts had been made, we feel that in none of the work which we have seen reported, has enough care been bestowed upon the establishment of the variations in the normal leucocyte counts in rabbits. It was not until after we had obtained many confusing results that we devoted our attention seriously to this point.

Before giving the results of our counts a brief description of the conditions under which the work was carried out will be given.

Young adult rabbits about a year old and of approximately the same size and weight were selected from a large number of country-raised rabbits. The males were separated from the females throughout the experiments and no pregnant females were used.

In the first series tested, as many as four or five rabbits were kept in a three- by four-foot cage, but in the subsequent series each rabbit was kept in a separate cage in order to prevent fighting, which might result in injuries or infections and thus influence the leucocytes.

All rabbits were fed once a day at approximately the same hour, 10 a. m. The food consisted of greens, grain and hay in such quantity that all would usually be consumed in four to six hours after feeding.

The blood for counting was taken from an ear vein and to insure a free flow of blood, after the ear was shaved, cleaned with alcohol and dried, a test tube containing warm water was placed beneath the ear; this caused a prompt dilatation of the veins and free flow of blood. As soon as the pipette for counting had been filled, smears for the differential counts were made.

Thoma-Zeiss blood counting apparatus was used; the pipettes were of the large, 1-20 dilution variety, the diluent was prepared fresh each day by adding four drops of glacial acetic acid to 40 cc. distilled water. In all cases two slides of five square millimeters each were counted in order to determine the total number of leucocytes.

The films for the differential counts were stained with Hastings' stain and a total of 200 cells counted for each differential. Duplicate counts made in a number of instances showed that this number of cells gave percentages which agreed quite closely with those given by counting 400 cells or more.

Since the value of this work depends entirely upon the accuracy of the counts we have attempted to get some idea of the percentage error in our counts. To this end we made duplicate determinations at frequent intervals throughout the work. A free flow of blood having been obtained from the ear vein, two pipettes were filled in rapid succession and two slides of five square millimeters each counted from each pipette. The average percentage variation of the two counts from the mean of the two counts in 48 such duplicate determinations was 7.5 per cent.

We further tried to get an idea of the accuracy of the counts by determining the percentage variation of each slide from the average of the two slides. In 174 such determinations the average percentage variation between slides was 3.9 per cent.

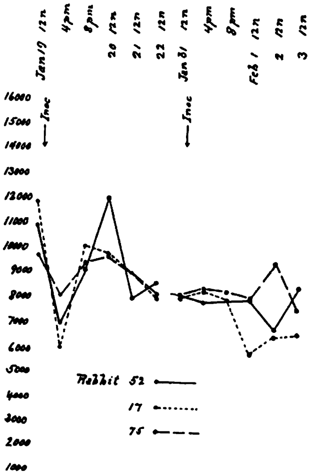


CHART I.—TOTAL LEUCOCYTE COUNTS.

Jan. 19 injected normal horse serum intravenously as follows: Rabbit No. 52, 0.1 cc.; Rabbit No. 17, 1 cc.; Rabbit No. 75, 5 cc. Jan. 31 injected 0.01 cc. normal horse serum intradermally in all three rabbits.

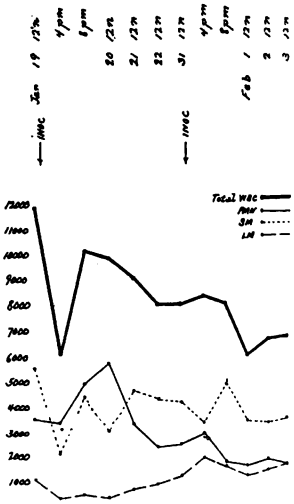


CHART III.

Rabbit No. 17 showing total leucocyte count and absolute values for polymorphonuclear, large and small mononuclear leucocytes.

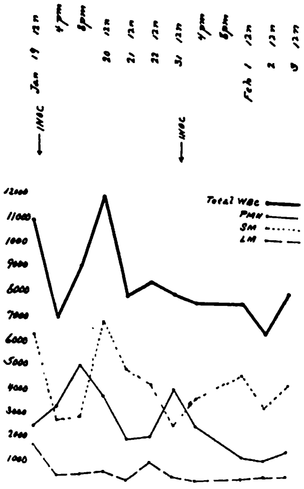


CHART II.

Rabbit No. 52 showing total leucocyte count and absolute values for polymorphonuclear, large and small mononuclear leucocytes.

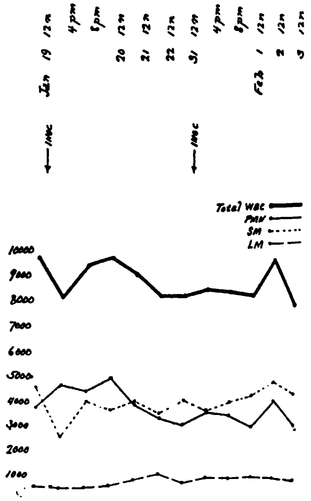


CHART IV.

Rabbit No. 75 showing total leucocyte count and absolute values for polymorphonuclear, large and small mononuclear leucocytes.

pipettes.

he results of the counts made from the separate pipettes are bulated below:

	Rabbit No. 23, March 14, 1910	Rabbit A	Rabbit No. 99, May 19, 1910	Rabbit No. 99, May 20, 1910
t pipette	8670	7360	4100	3540
pipette	8660	7880	4020	4060
pipette	8470	7720	3920	3560
h pipette			4220	4060
h pipette			3780	3700
Average	8600	7653	4008	3784
'eatest variation from average....	1.5%	3.8%	5.4%	7.3%

The above percentages represent all the data we have on e accuracy of the counts and we feel they indicate that our sults may be taken as trustworthy.

FIRST SERIES.

ɔbit No. 52. January 19, 1910, injected 0.1 cc. normal horse serum intravenously. January 31, 1910, cutaneous anaphylactic test, 0.01 cc. normal horse serum intradermally. Local reaction negative.

	Total Leucocytes	Pmn*		Lm		Sm		Eos		Mst	
		%	Total	%	Total	%	Total	%	Total	%	Total
ore injection...	10900	22.5	2452	15.0	1635	57.5	6268	3.5	381	1.5	164
hours after....	7000	47.4	3318	6.6	462	39.4	2758	4.0	280	2.4	168
“ “	9100	55.6	5060	6.3	574	32.6	2966	1.6	146	3.6	328
“ “	12000	32.3	3876	6.0	720	57.6	6912	1.3	156	2.6	312
“ “	8000	27.0	2160	5.5	440	63.0	5040	2.5	200	2.0	160
“ “	8600	27.6	2373	14.3	1230	52.0	4477	4.0	344	2.0	174
ore test........	8200	52.3	4287	9.4	771	35.0	2870	1.5	124	1.6	132
hours after....	7900	36.6	2892	8.6	680	51.3	4053	2.6	206	0.6	48
“ “	Lost	42.8	..	9.2	..	45.2	..	1.6	..	1.2	..
“ “	8000	22.0	1760	11.0	880	64.3	5144	0.3	24	2.3	184
“ “	6900	25.0	1725	15.0	1035	55.5	3829	1.5	104	3.0	207
“ “	8500	25.0	2125	14.0	1190	57.0	4845	4.0	340	..	..

ɔbit No. 17. January 19, 1910, injected 1.0 cc. normal horse serum intravenously. January 31, 1910, cutaneous anaphylactic test, 0.01 cc. normal horse serum intradermally. Local reaction doubtful.

	Total Leucocytes	Pmn		Lm		Sm		Eos		Mst	
		%	Total	%	Total	%	Total	%	Total	%	Total
ɔre injection...	11800	29.8	3517	9.0	1062	46.9	5535	9.4	1110	4.7	555
hours after....	6100	54.6	3331	5.0	305	34.0	2074	5.3	324	1.0	61
“ “	10100	48.3	4879	4.6	465	43.0	4343	3.0	303	1.0	101
“ “	9800	58.3	5714	3.6	353	30.6	2999	3.6	353	3.6	353
“ “	9000	36.3	3267	7.6	684	51.0	4590	4.0	360	1.0	90
“ “	8000	29.6	2368	10.4	832	53.2	4256	3.2	256	3.6	288
ɔre test........	8000	30.6	2448	14.3	1144	51.6	4128	1.3	104	2.0	160
hours after....	8300	34.3	2847	21.3	1770	39.0	3237	2.3	191	3.0	249
“ “	8000	20.0	1600	18.0	1440	60.4	4832	0.8	64	0.8	64
“ “	6000	24.0	1440	18.0	1080	55.2	3312	0.8	48	2.0	120
“ “	6600	25.5	1683	19.5	1287	49.5	3267	3.0	198	2.5	165
“ “	6700	21.5	1440	22.5	1508	51.0	3417	1.5	100	3.5	235

bit No. 75. January 19, 1910, injected 5.0 cc. normal horse serum intravenously. January 31, 1910, cutaneous anaphylactic test, 0.01 cc. normal horse serum intradermally. Local reaction positive.

	Total Leucocytes	Pmn		Lm		Sm		Eos		Mst	
		%	Total	%	Total	%	Total	%	Total	%	Total
re injection...	9700	38.7	3753	5.7	552	46.7	4529	7.0	679	1.8	174
ıours after....	8100	57.3	4641	6.0	486	32.0	2592	4.0	324	0.7	56
“ “	9400	46.6	4380	5.6	526	42.3	3976	4.6	432	0.7	65
“ “	9700	51.0	4947	6.0	583	38.2	3705	3.2	310	1.5	145
“ “	9000	42.6	3834	9.0	810	44.6	4014	3.0	270	0.6	54
“ “	8200	40.0	3280	13.0	1066	43.0	3526	2.0	164	2.0	164
re test........	8200	37.2	3050	8.8	722	49.2	4035	1.6	131	3.2	262
ıours after....	8400	42.4	3562	10.8	907	43.2	3629	0.8	67	2.8	235
“ “	8300	40.8	3386	10.0	830	46.8	3884	1.6	133	0.8	66
“ “	8100	35.6	2884	10.4	842	52.0	4212	0.4	32	1.6	130
“ “	9500	41.0	3895	8.0	760	49.0	4655	..	..	2.0	190
“ “	7700	36.0	2772	7.5	578	53.3	4104	1.3	100	1.9	147

he variations which the leucocytes have undergone are e readily seen if the above figures are plotted out in the n of curves. Chart I shows the total leucocyte count for

tion of normal horse serum the leucocyte count had fallen in all the rabbits. The greatest drop is in rabbit No. 17, which received 1 cc. serum; the next greatest drop is in No. 52 which received 0.1 cc. serum; while the leucocytes of No. 75, which received 5 cc. serum, showed the smallest drop. Eight hours after the inoculation the leucocytes of all three rabbits had risen but not to their original levels. At the end of 24 hours the leucocytes of No. 52 slightly exceeded their original level and from this point on to the end of 72 hours all of the curves fell.

Following the intradermal injection of 0.01 cc. serum there was practically no change in the total leucocyte counts at the end of four and eight hours, in any of the rabbits. At the end of 48 hours the leucocytes of No. 75 were slightly increased. This rabbit was the only one of the series which gave a well marked positive reaction.

Charts II, III and IV show the total leucocyte count, the total number of polymorphonuclears, small and large mononuclears plotted out separately for each rabbit. It is evident from these three charts that the low leucocyte counts, four hours after inoculation, are due to a fall in the small mononuclears; this fall being great enough to bring the total count down in spite of a slight increase in the polymorphonuclears in the case of Nos. 52 and 75. In the case of No. 52, eight hours after inoculation the increase in the total count is due largely to an increase in the polymorphonuclears, while the still further increase in the total count at the end of 24 hours is due to a recovery of the small mononuclears which elements carry the curve to its high point in spite of a falling off of the polymorphonuclears at this time. There seems to be nothing noteworthy about the differential counts following the intradermal inoculation.

SECOND SERIES.

Rabbit No. 15 1910	Total Leucocytes	Pmn		Lm		Sm		Eos		Mst	
		%	Total	%	Total	%	Total	%	Total	%	Total
March 2, 9 a. m.	10195	36.0	3670	8.5	866	52.5	5352	1.0	102	2.0	204
1 p. m.	9965	36.0	3587	11.5	1145	47.5	4733	0.5	50	4.5	448
5 p. m.	11490	40.0	4596	7.0	804	47.5	5457	..	..	5.5	631
3, 9 a. m.	9875	28.0	2765	9.0	888	57.5	5678	1.0	99	4.5	434
4, 9 a. m.	9520	29.0	2760	10.0	952	57.0	5426	..	..	4.0	380
5, 9 a. m.	11090	32.5	3604	8.0	887	51.5	5711	3.5	388	4.5	499
March 16, 9 a. m.	10400	40.22	4191	16.88	1755	36.88	3836	..	..	6.0	624
1 p. m.	12580	31.0	3899	11.0	1383	51.5	6478	0.5	63	6.0	754
5 p. m.	12800	51.5	6592	10.0	1280	32.5	4160	0.5	64	5.5	704
17, 9 a. m.	11280	33.0	3722	9.5	1071	53.5	6034	..	..	4.0	451
18, 9 a. m.	9800	35.5	3479	10.5	1029	48.0	4704	1.0	98	5.0	490
19, 9 a. m.	9560	32.5	3107	11.0	1051	50.0	4780	1.0	95	5.5	525
March 21, 9 a. m.	9580	30.5	2922	12.0	1149	52.5	5029	..	..	5.0	479
1 p. m.	9860	38.0	3746	11.0	1084	47.0	4634	..	..	4.0	394
5 p. m.	9060	28.5	2582	16.0	1449	53.5	4847	0.5	45	1.5	136
22, 9 a. m.	6520	27.5	1793	11.25	733	55.75	3635	..	..	5.5	358
23, 9 a. m.	9880	31.0	3062	4.5	444	60.5	5977	0.5	49	3.5	345
24, 9 a. m.	11660	31.0	3614	4.5	524	60.0	6996	..	..	4.5	524
April 6, 9 a. m.	9920	39.0	3868	12.0	1190	45.5	4513	..	..	3.5	347
(Inoc. 0.01 cc. serum intradermally.)											
1 p. m.	14460	46.5	6724	4.0	578	45.5	6579	..	..	4.0	578
5 p. m.	15200	22.5	3420	6.5	988	68.5	10412	..	..	2.5	380
7, 9 a. m.	11100	41.0	4551	13.5	1490	41.0	4551	..	..	4.5	499
8, 9 a. m.	10300	27.0	2781	6.0	618	64.0	6592	..	..	3.0	309
9, 9 a. m.	9700	41.5	4025	14.5	1406	39.5	3831	..	..	4.5	436
Rabbit No. 24											
March 2, 9 a. m.	5905	..	..	..	..	..	..	..	..	..	..
1 p. m.	8360	39.0	3260	13.5	1128	44.0	3678	0.5	41	3.0	250
5 p. m.	7990	29.5	2357	9.0	719	56.5	4514	0.5	40	4.5	359
3, 9 a. m.	5620	27.5	1545	15.0	843	56.5	3175	..	..	1.0	56
4, 9 a. m.	6290	24.0	1509	11.0	692	61.0	3837	..	..	4.0	251
5, 9 a. m.	5590	34.5	1928	7.5	419	55.5	3102	..	..	2.5	139
March 16, 9 a. m.	8880	20.5	1820	13.5	1198	56.0	4972	4.0	355	6.0	532
1 p. m.	10660	35.2	3752	12.8	1364	44.0	4690	4.4	469	3.6	383
5 p. m.	10220	37.0	3781	10.5	1073	42.0	4292	4.5	460	6.0	613
17, 9 a. m.	7140	22.4	1599	16.0	1142	54.4	3884	5.6	400	1.6	114
18, 9 a. m.	7500	33.5	2512	9.5	712	52.0	3900	3.0	225	2.0	150
19, 9 a. m.	7160	32.0	2291	12.0	859	50.0	3580	3.0	214	3.0	214

---

n all the tables the following abbreviations are used:
Wbc=white blood cells.
Pmn=polymorphonuclears.
Lm=large mononuclears.
Sm=small mononuclears.
Eos=eosinophiles.
Mst=mast cells.

Rabbit No. 24—Cont.

	Total Leucocytes	Pmn %	Pmn Total	Lm %	Lm Total	Sm %	Sm Total	Eos %	Eos Total	Mst %	Mst Total
March 21, 9 a. m.	6300	12.0	756	16.0	1008	65.0	4095	3.5	220	3.5	220
(Inoc. 0.01 cc. serum intravenously.)											
1 p. m.	7500	35.5	2662	13.0	975	43.5	3262	1.0	75	7.0	525
5 p. m.	8680	47.0	4079	8.0	694	38.5	3341	3.0	260	3.5	303
22, 9 a. m.	5900	27.5	1622	12.0	708	56.0	3304	0.5	29	4.0	236
23, 9 a. m.	5320	27.0	1436	5.5	292	59.5	3164	3.0	159	5.0	266
24, 9 a. m.	5820	30.5	1775	9.5	553	51.5	2997	3.0	174	5.5	329
April 6, 9 a. m.	7100	27.0	1917	5.5	390	62.0	4402	2.0	142	3.5	248
(Inoc. 0.01 cc. serum intradermally.)											
1 p. m.	7660	44.0	3370	8.0	612	42.5	3255	1.5	115	4.0	309
5 p. m.	8940	30.5	2726	3.0	268	64.5	5766	1.0	89	1.0	89
7, 9 a. m.	6760	41.0	2771	5.5	372	51.0	3447	2.0	135	0.5	34
8, 9 a. m.	5680	34.0	1931	7.5	426	52.0	2953	4.0	227	2.5	142
9, 9 a. m.	7000	45.5	3185	7.5	525	41.0	2870	2.0	140	4.0	280

Rabbit No. 92

	Total Leucocytes	Pmn %	Pmn Total	Lm %	Lm Total	Sm %	Sm Total	Eos %	Eos Total	Mst %	Mst Total
March 2, 9 a. m.	7580	57.0	4320	8.5	644	33.5	2539	..	..	1.0	76
1 p. m.	9635	51.5	4962	9.0	867	38.0	3661	1.0	96	0.5	48
5 p. m.	9670	63.5	6140	6.0	580	26.5	2562	..	..	4.0	387
3, 9 a. m.	6840	61.0	4172	6.5	444	31.5	2154	..	..	1.0	68
4, 9 a. m.	11160	51.5	5747	6.5	725	40.0	4464	1.0	111	1.0	111
5, 9 a. m.	11310	76.0	8595	2.5	282	19.5	2205	0.5	56	1.5	169
March 16, 9 a. m.	6240	48.0	2995	9.0	561	37.0	2308	1.5	93	4.5	280
1 p. m.	8040	34.5	2778	10.0	804	52.5	4221	0.5	40	2.5	201
5 p. m.	6880	46.5	3199	9.0	619	42.0	2889	..	..	2.5	172
9 a. m.	7600	35.0	2660	13.5	1026	50.5	3838	..	..	1.0	76
17, 9 a. m.	9540	27.0	2576	9.5	906	60.5	5772	0.5	48	2.5	238
18, 9 a. m.	6460	56.5	3650	4.5	290	36.5	2358	0.5	32	2.0	129
March 21, 9 a. m.	6740	37.0	2494	9.5	640	52.0	3505	0.5	33	1.0	67
(Inoc. 1.0 cc. serum intravenously.)											
1 p. m.	6220	41.5	2581	6.5	404	48.0	2985	1.5	93	2.5	155
5 p. m.	7440	56.0	4166	6.0	446	35.5	2641	..	..	2.5	186
22, 9 a. m.	6780	42.0	2847	11.0	746	44.5	3017	..	..	2.5	169
23, 9 a. m.	8260	39.0	3221	8.0	661	50.5	4171	..	..	2.5	206
24, 9 a. m.	6260	30.0	1878	4.0	250	61.0	3819	0.5	31	4.5	282
April 6, 9 a. m.	6920	33.5	2318	4.5	311	62.0	4290	..	..	..	..
(Inoc. 0.01 cc. serum intradermally.)											
1 p. m.	10060	53.0	5332	5.5	553	40.0	4024	0.5	50	1.0	100
5 p. m.	7940	36.5	2898	2.5	108	60.0	4764	0.5	40	0.5	40
7, 9 a. m.	6300	52.0	3276	10.5	661	34.5	2173	0.5	32	2.5	158
8, 9 a. m.	8360	45.0	3762	8.0	669	45.5	3804	0.5	42	1.0	83
9, 9 a. m.	5320	34.0	1809	5.0	266	58.5	3112	0.5	26	2.0	106

Rabbit No. 104

	Total Leucocytes	Pmn %	Pmn Total	Lm %	Lm Total	Sm %	Sm Total	Eos %	Eos Total	Mst %	Mst Total
March 2, 9 a. m.	7880	37.0	2915	8.5	670	51.5	4058	..	..	3.0	236
1 p. m.	10650	40.5	4318	6.0	639	49.0	5218	1.0	106	3.5	372
5 p. m.	10340	36.0	3722	11.5	1189	46.0	4756	..	..	6.5	672
3, 9 a. m.	7460	56.0	4177	4.0	298	37.0	2760	..	..	3.0	223
4, 9 a. m.	7160	33.5	2398	6.0	429	55.5	3974	0.5	36	4.5	322
5, 9 a. m.	9000	30.5	2745	6.5	585	58.5	5265	1.5	135	3.0	270
March 16, 9 a. m.	8860	25.5	2259	8.0	709	57.5	5094	1.0	83	8.0	709
1 p. m.	11160	42.0	4687	7.5	837	42.0	4687	5.5	613	3.0	334
5 p. m.	13480	35.5	4785	12.5	1685	45.5	6133	2.5	337	4.0	539
17, 9 a. m.	8760	33.0	2891	8.0	701	50.0	4380	4.5	394	4.5	394
18, 9 a. m.	12180	37.0	4506	10.5	1279	41.5	5054	3.0	365	8.0	974
19, 9 a. m.	10380	35.5	3685	12.0	1245	39.0	4048	3.5	382	5.0	519
March 21, 9 a. m.	5900	22.0	1298	14.5	855	55.5	3274	3.0	177	5.0	295
(Inoc. 5.0 cc. serum intravenously.)											
1 p. m.	9480	66.0	6256	4.5	426	26.5	2512	1.5	142	1.5	142
5 p. m.	7700	46.5	3580	7.5	577	37.5	2887	7.5	577	1.0	77
22, 9 a. m.	9020	36.5	3292	11.5	1037	46.5	4194	3.0	270	2.5	225
23, 9 a. m.	7940	45.0	3578	10.5	833	38.5	3057	1.0	79	5.0	394
24, 9 a. m.	8520	41.5	3535	11.0	937	39.0	3322	0.5	42	8.0	684
April 6, 9 a. m.	6280	38.5	2417	10.0	628	44.5	2794	1.0	62	6.0	376
(Inoc. 0.01 cc. serum intradermally.)											
1 p. m.	10960	70.0	7672	2.5	274	24.5	2685	0.5	54	2.5	274
5 p. m.	10640	60.5	6437	2.0	212	34.5	3670	0.25	26	2.75	292
7, 9 a. m.	9200	58.0	5336	8.0	736	32.5	2900	0.5	46	1.0	92
8, 9 a. m.	8820	32.0	2822	8.0	705	56.0	4939	..	..	4.0	353
9, 9 a. m.	8040	35.5	2854	4.0	321	56.5	4542	1.0	80	3.0	241

Chart V represents the total leucocyte counts for the four rabbits of the third series plotted out in such a way that one can compare the variations in the whole series at a glance. This chart shows that the variations in the leucocytes during the two periods of observation before inoculation, March 2-5 and March 16-19 were approximately as great as those following the intravenous injection of serum, March 21, and the cutaneous test, April 6, except in the case of rabbit No. 15, which was a control and did not receive the intravenous inoculation with the others on March 16. This is made clear by the following figures:

	Two periods of observation before inoculation: Mch. 2-5	Two periods of observation before inoculation: Mch. 16-19	Following intravenous inoculation*: Mch. 21-24	Following intradermal inoculation: Apr. 6-9
Rabbit No. 15:				
Highest count..	11490	12800	11660	15260
Lowest count..	9520	9560	6520	9760
Variation	1970	3240	5140	5500
Rabbit No. 24:				
Highest count..	8360	10660	8680	8940
Lowest count..	5620	7140	5320	5680
Variation	2740	3520	3360	3260
Rabbit No. 92:				
Highest count..	11310	9540	8260	10060
Lowest count..	6840	6240	6220	5320
Variation	4470	3300	2040	4740
Rabbit No. 104:				
Highest count..	10650	12180	9480	10960
Lowest count..	7160	8760	5900	6280
Variation	3490	3420	3580	4680

This chart (V) shows in all cases an increase in the leucocytes at the count made either three hours or seven hours after feeding, with a fall by the next morning at 9 o'clock to somewhere near the original level. It seems quite reasonable to regard this increase as a digestive leucocytosis. The effect, if any, of the intravenous injection of serum, March 21, and the intradermal inoculation, April 6, is to depress to a slight extent the height of this digestive leucocytosis.

Charts VI, VII, VIII and IX represent the total number of leucocytes and absolute values of the polymorphonuclear, large, and small mononuclear leucocytes for rabbits Nos. 15, 24, 92 and 104, respectively. These charts show that in general an increase in the total leucocyte count is due to an increase in the two principal elements, the polymorphonuclears and small mononuclear leucocytes. In this series however, the polymorphonuclears as a rule undergo a greater increase than do the small mononuclears.

In order to determine if there is anything characteristic in the differential count following the intravenous injection of fairly large amounts of serum or the intradermal injection of minimal amounts we have analyzed the changes in the total counts and the number of polymorphonuclears and small mononuclears three hours and seven hours after injection. For purposes of comparison we have included the corresponding counts made before injection. The results are shown in the accompanying table, examination of which shows that an increase in the total count after the injection of serum may be due to an increase of either or both of the principal leucocytes and that this relationship does not differ from that entering into increases in the total count which occurred before the injection of any serum.

---

* Rabbit No. 15 was a control and did not receive an intravenous injection.

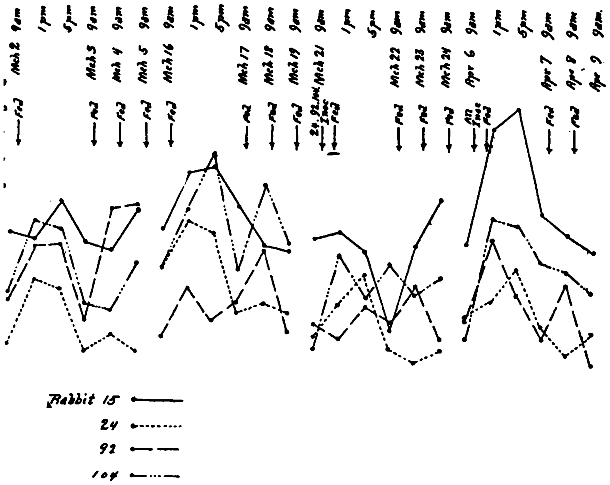


CHART V.

abbits Nos. 15, 24, 92 and 104 showing total leucocyte counts entire period of observation. March 21 injected normal horse um intravenously as follows: Rabbit No. 24, 0.1 cc.; Rabbit . 92, 1 cc.; Rabbit No. 104, 5 cc. April 6 injected 0.01 cc. mal horse serum intradermally in all rabbits.

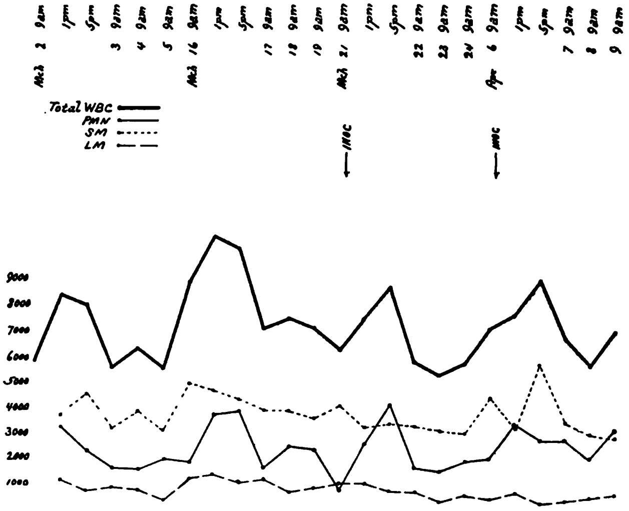


CHART VII.

Rabbit No. 24 showing total leucocyte counts and absolute values of polymorphonuclear, large and small mononuclear leucocytes for entire period of observation.

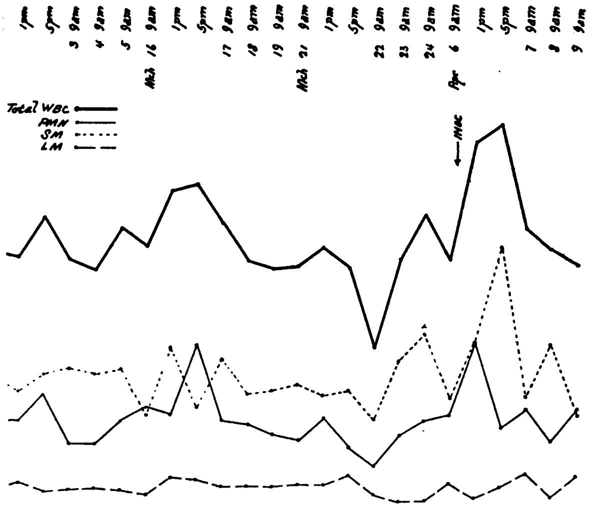


CHART VI.

bbit No. 15 showing total leucocyte counts and absolute values olymorphonuclear, large and small mononuclear leucocytes for re period of observation. April 6, 10 a. m., injected 0.01 cc. nal horse serum intradermally.

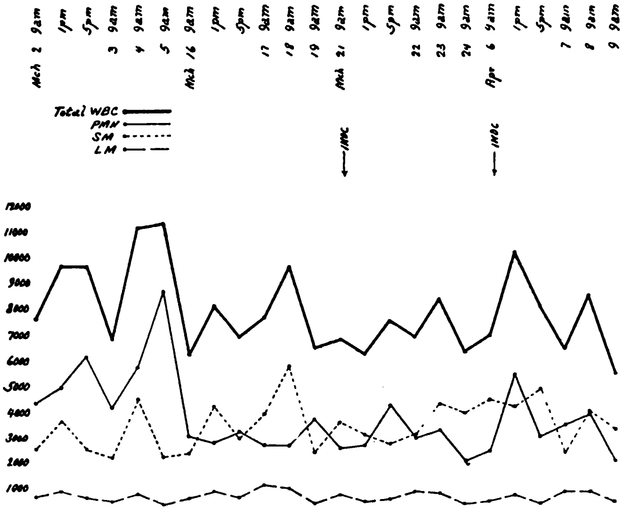


CHART VIII.

Rabbit No. 92 showing total leucocyte counts and absolute values of polymorphonuclear, large and small mononuclear leucocytes for entire period of observation.

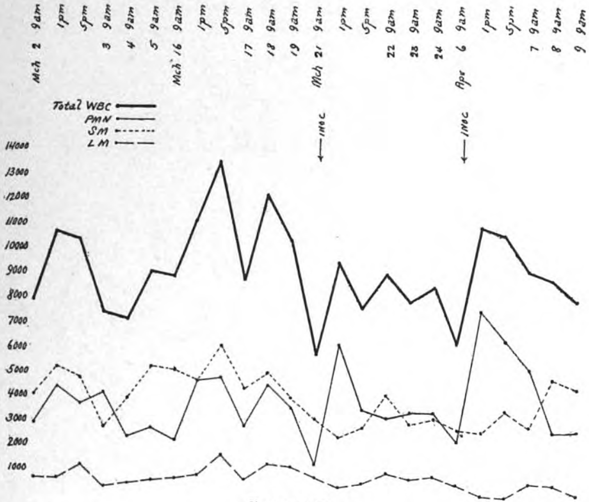


CHART IX.

Rabbit No. 104 showing total leucocyte counts and absolute values of polymorphonuclear, large and small mononuclear leucocytes for entire period of observation.

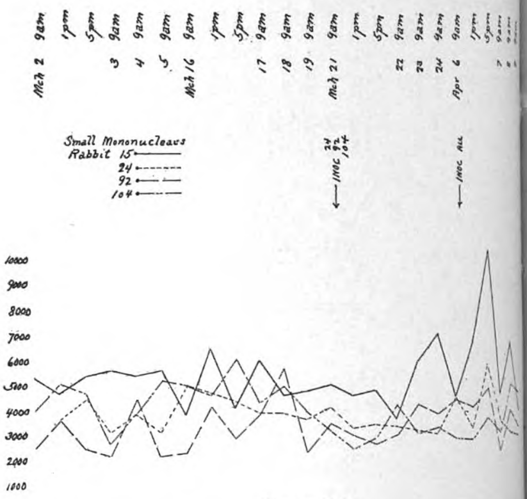


CHART XI.

Rabbits Nos. 15, 24, 92 and 104 showing absolute values small mononuclear leucocytes.

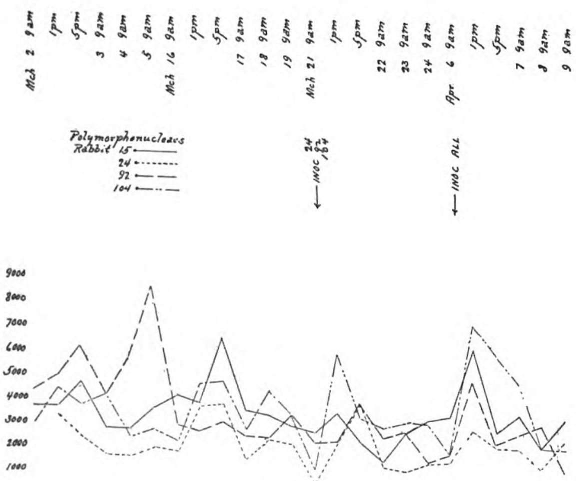


CHART X.

Rabbits Nos. 15, 24, 92 and 104 showing absolute values of polymorphonuclear leucocytes.

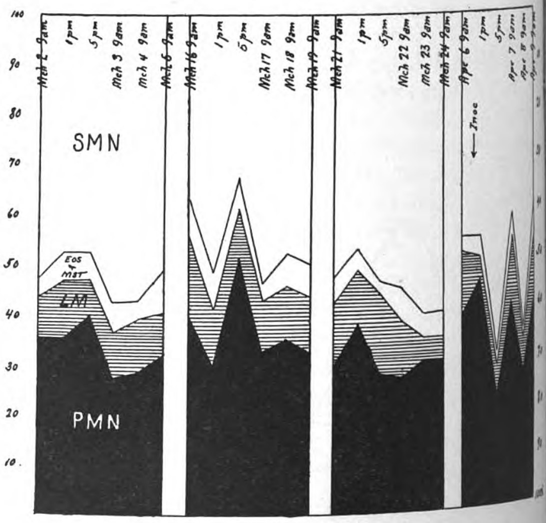


CHART XII.

Rabbit No. 15 showing percentage values of polymorphonuclear, large mononuclear, eosinophiles and mast cells combined, and small mononuclear leucocytes for entire period of observation.

	March 2		March 16		March 21		April 6	
	1 p. m.	5 p. m.	1 p. m.	5 p. m.	1 p. m.	5 p. m.	1 p. m.	5 p. m
bbit No. 15:								
otal leucocytes.	—	+	+	+	+	—	+	+
mn	○	+	—	+	+	—	+	—
mn	—	+	+	—	—	+	+	+
bbit No. 24:								
otal leucocytes.	+	—	+	—	+	+	+	+
mn		—	+	+	+	+	+	—
mn		+	—	—	—	○	—	+
bit No. 92:								
otal leucocytes.	+	○	+	—	—	+	+	—
mn	+	+	—	+	+	+	+	—
mn	+	—	+	—	—	—	—	+
bit No. 104:								
otal leucocytes.	+	—	+	+	+	—	+	—
mn	+	—	+	+	+	—	+	—
mn	+	—	—	+	—	+	—	+

- denotes an increase over the preceding count.
- denotes a decrease from the preceding count.
) denotes no change from the preceding count.

or the purpose of better comparing the changes in the ymorphonuclear and small mononuclear counts, we have pared Charts X and XI in which their curves have been erimposed. Chart X shows a definite rise in the polyrphonuclears of all rabbits three hours after the intramal inoculation of 1/100 cc. serum; this rise, however, participated in by rabbit No. 15, which had not been viously injected, as well as by the others which had been cted intravenously on March 21. Chart XI shows noth- remarkable except the sharp rise in the mononuclears of bit No. 15 on April 6 at 5 p. m., which we are unable to lain.

harts XII, XIII, XIV, XV, show the percentage values he differential counts on rabbits Nos. 15, 24, 92 and 104, ectively. The black areas at the bottom of the charts esent the percentage of polymorphonuclears; the shaded s, the large mononuclears; the unshaded areas at the top he charts, the small mononuclears; while the unshaded s between the small and large mononuclears represent the ophiles and mast cells combined. These charts show the relative numbers of large mononuclears, eosinophiles mast cells do not undergo great variations, and that the ionship between the polymorphonuclears and small mono- ears is, in general, a reciprocal one; that is an increase e percentage of polymorphonuclears is accompanied by a ase in the percentage of small mononuclears and *vice*

is important to realize the different impression one gets a consideration of the differential count expressed in ntages and in absolute values. To illustrate, suppose a leucocyte count of 8000 cells, of which the polymorphoars are 60 per cent, small mononuclears 30 per cent, mononuclears, eosinophiles, and mast cells combined 10 ent. Now imagine the total count to increase to 10,000 cells. The percentage values now change to 68 per cent for the polymorphonuclears, 24 per cent small mononuclears, and 8 per cent mononuclears, eosinophiles and mast cells combined. How little idea one could get of the real change from a consideration of the percentages alone can be seen from this example;

W. B. C. 8000	Pmn	60% = 4800
	Sm	30 = 2400
	Lm, Eos and Mst.....	10 = 800
W. B. C. 10000	Pmn	68% = 6800
	Sm	24 = 2400
	Lm, Eos and Mst.....	8 = 800

In order to confirm the results of the preceding series we ran through a third series, consisting of rabbits Nos. 105, 106, 107 and 108. Of these No. 105 served as a control and received on sensitizing injection; the remaining three received intravenous injections of normal horse serum on June 16 at 10 a. m. as follows:

Rabbit No. 106 1.0 cc. serum.
Rabbit No. 107 2.5 cc. serum.
Rabbit No. 108 5.0 cc. serum.

The total and differential counts are given in the following tables:

THIRD SERIES.

Rabbit No. 105 1910	Total Leucocytes	Pmn %	Pmn Total	Lm %	Lm Total	Sm %	Sm Total	Eos %	Eos Total	Mst %	Mst Total
May 23, 9 a. m.	9900	26.5	2623	3.5	347	60.5	5989	4.5	446	5.0	495
1 p. m.	12140	28.5	3460	4.0	485	65.0	7891	1.5	182	1.0	121
5 p. m.	12900	27.5	3547	3.5	451	63.5	8191	2.0	258	3.5	451
24, 9 a. m.	9780	32.0	3129	5.0	489	59.0	5770	1.5	146	2.5	244
25, 9 a. m.	9080	22.0	1997	6.0	545	66.0	5993	2.0	181	4.0	363
26, 9 a. m.	8020	21.5	1724	5.5	441	69.0	5534	2.0	160	2.0	160
June 1, 9 a. m.	7540	21.0	1583	5.0	377	71.5	5391	1.0	75	1.5	113
1 p. m.	10320	24.5	2528	11.5	1187	62.0	6398	..	..	2.0	206
5 p. m.	11340	23.0	2608	5.5	624	70.0	7988	..	..	1.5	170
2, 9 a. m.	10500	16.0	1680	7.0	735	71.5	7507	..	..	5.5	577
3, 9 a. m.	9420	22.0	2072	2.5	235	71.5	6735	0.5	47	3.5	330
4, 9 a. m.	10600	20.0	2120	5.0	530	72.5	7685	..	..	2.5	265
June 16, 9 a. m.	7720	36.0	2779	6.0	463	56.5	4362	0.5	38	1.0	77
1 p. m.	6980	39.5	2757	5.5	384	58.0	3699	..	..	2.0	139
5 p. m.	8000	33.0	2640	2.5	200	61.0	4880	..	..	3.5	280
17, 9 a. m.	7940	26.5	2104	3.0	238	65.0	5161	0.5	40	5.0	397
18, 9 a. m.	6800	21.5	1462	5.0	340	71.5	4862	..	..	2.0	136
19, 9 a. m.	5300	26.5	1404	6.0	318	66.5	3524	..	..	1.0	53
June 29, 9 a. m.	8660	21.5	1861	4.0	346	69.0	5975	1.0	87	4.5	390
(Inoc. 0.01 cc. serum intradermally.)											
1 p. m.	10250	27.0	2819	3.0	313	65.5	6838	1.0	104	3.5	365
5 p. m.	11260	38.5	4335	4.5	507	55.0	6198	..	..	2.0	225
30, 9 a. m.	9540	31.5	3005	5.0	477	59.5	5676	..	..	4.0	382
July 1, 9 a. m.	8560	25.5	2183	5.0	428	65.5	5607	1.0	85	3.0	257
2, 9 a. m.	7440	33.5	2492	2.5	186	62.0	4613	..	..	2.0	149
Rabbit No. 106											
May 23, 9 a. m.	4920	27.5	1353	7.5	369	64.0	3148	..	..	1.0	49
1 p. m.	7140	29.5	2106	10.5	749	58.0	4141	..	..	2.0	143
5 p. m.	7200	23.0	1656	9.0	648	67.0	4824	..	..	1.0	72
24, 9 a. m.	6100	11.0	671	4.5	274	81.0	4941	2.5	152	1.0	61
25, 9 a. m.	5580	29.5	1646	11.0	614	55.5	3097	0.5	28	3.5	195
26, 9 a. m.	4660	21.0	978	12.0	550	62.5	2912	0.5	23	4.0	186
June 1, 9 a. m.	6060	22.5	1363	14.0	848	56.0	3393	0.5	30	7.0	424
1 p. m.	8720	37.5	3270	6.5	557	51.0	4447	..	..	5.0	436
5 p. m.	6560	36.0	2361	10.5	689	45.5	2985	..	..	8.0	825
2, 9 a. m.	6720	31.5	2117	10.5	706	51.0	3427	..	..	7.0	470
3, 9 a. m.	4360	32.0	1395	5.0	218	55.5	2420	..	..	7.5	327
4, 9 a. m.	4360	47.5	2071	6.0	262	38.0	1657	1.0	43	7.5	327
June 16, 9 a. m.	4040	28.5	1151	7.0	283	55.5	2242	0.5	20	8.5	343
(Inoc. 1.0 cc. serum intravenously.)											
1 p. m.	8300	47.5	3942	4.5	373	45.0	3735	..	..	3.0	249
5 p. m.	6440	30.5	1964	7.0	451	59.5	3832	..	..	3.0	198
17, 9 a. m.	3800	33.5	1273	6.5	247	54.0	2052	0.5	19	5.5	209
18, 9 a. m.	4760	45.5	2166	10.5	500	39.0	1836	..	..	5.0	238
19, 9 a. m.	4920	39.0	1919	7.0	344	48.0	2361	..	..	6.0	295
June 29, 9 a. m.	5580	47.5	2650	7.0	390	40.0	2232	1.5	83	4.0	223
(Inoc. 0.01 cc. serum intradermally.)											
1 p. m.	6460	37.0	2389	6.5	420	55.5	3585	..	..	1.0	65
5 p. m.	6250	33.0	2062	10.5	656	46.0	2875	1.0	63	9.5	594
30, 9 a. m.	6780	44.5	3017	10.5	712	35.5	2407	1.0	68	8.5	576
July 1, 9 a. m.	7390	37.5	2767	8.5	627	47.0	3469	1.5	111	5.5	406
2, 9 a. m.	4720	40.0	1888	6.5	307	49.0	2313	0.5	23	4.0	189
Rabbit No. 107											
May 23, 9 a. m.	4600	38.5	1771	13.0	598	44.0	2024	..	..	4.5	207
1 p. m.	7480	29.5	2206	12.5	935	52.0	3889	..	..	6.0	449
5 p. m.	9440	27.5	2596	10.5	991	56.5	5333	0.5	47	5.0	472
24, 9 a. m.	4440	24.5	1088	13.0	577	60.0	2664	..	..	2.5	111
25, 9 a. m.	5580	29.0	1618	14.0	781	55.0	3069	..	..	2.0	112
26, 9 a. m.	5840	32.5	1898	11.0	642	50.0	2920	..	..	6.5	380

---

bbit No. 15 served as a control and did not receive intras inoculation.

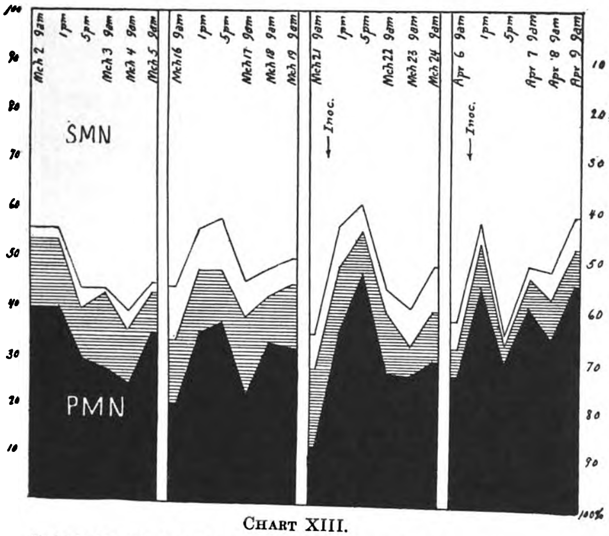


Chart XIII.

Rabbit No. 24 showing percentage values of polymorphonuclear, large mononuclear, eosinophiles and mast cells combined, and small mononuclear leucocytes for entire period of observation.

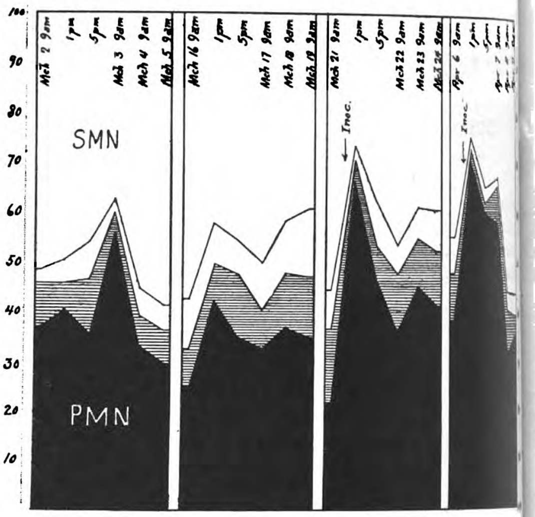


Chart XV.

Rabbit No. 104 showing percentage values of polymorphonuclear large mononuclear, eosinophiles and mast cells combined, and small mononuclear leucocytes for entire period of observation.

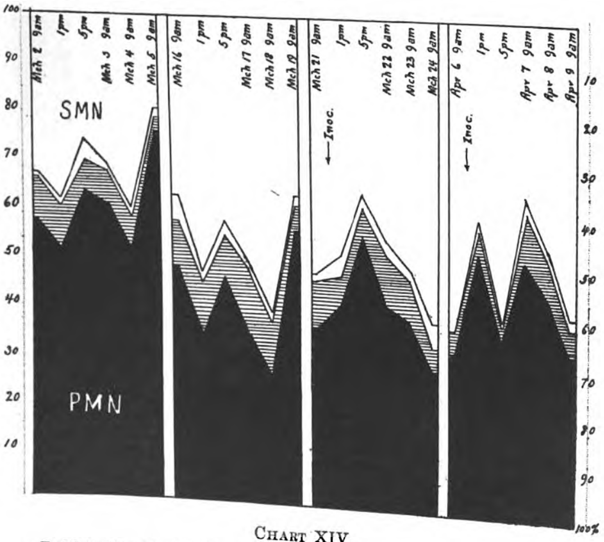


Chart XIV.

Rabbit No. 92 showing percentage values of polymorphonuclear, large mononuclear, eosinophiles and mast cells combined, and small mononuclear leucocytes for entire period of observation.

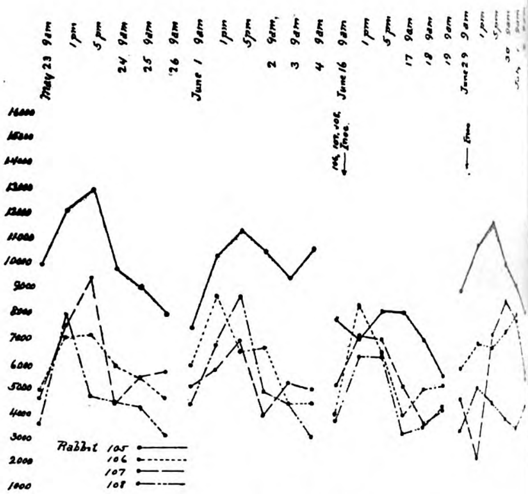


Chart XVI.

Rabbits Nos. 105, 106, 107 and 108 showing total leucocyte counts for entire period of observation. June 16 injected normal horse serum intravenously as follows: Rabbit No. 106, 1 cc.; Rabbit No. 107, 2.5 cc.; Rabbit No. 108, 5 cc. June 29 injected 0.01 cc. normal horse serum intradermally in all rabbits.

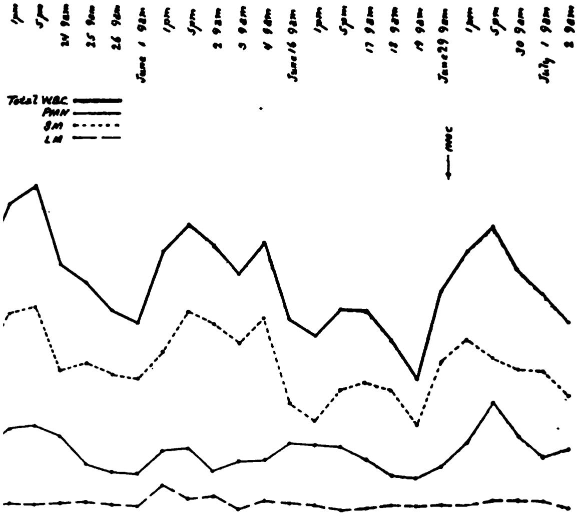


CHART XVII.

bbit No. 105 showing total leucocyte counts and absolute s of polymorphonuclear, large and small mononuclear leuco- for entire period of observation.

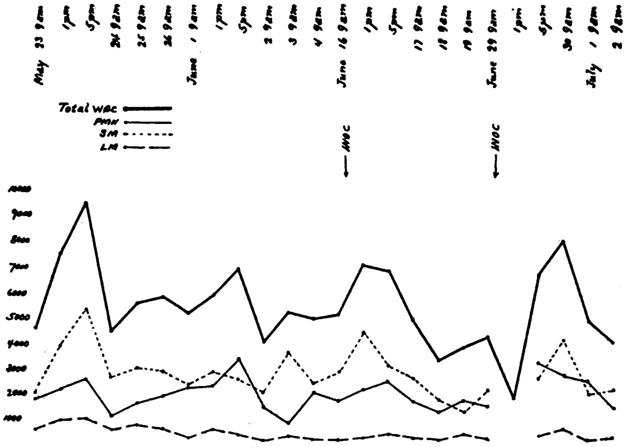


CHART XIX.

Rabbit No. 107 showing total leucocyte counts and absolute values of polymorphonuclear, large and small mononuclear leucocytes for entire period of observation.

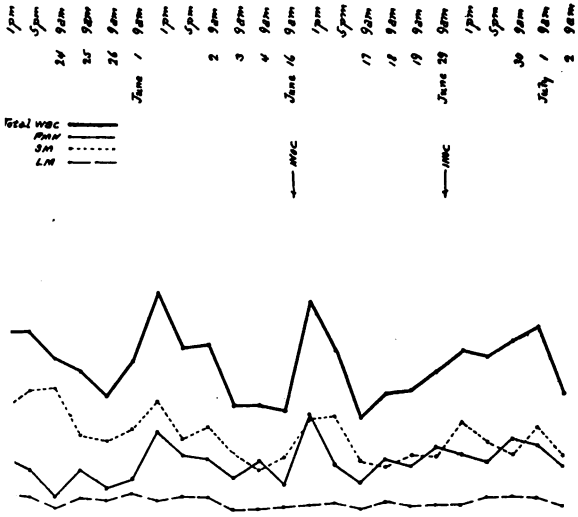


CHART XVIII.

ıt No. 106 showing total leucocyte counts and absolute of polymorphonuclear, large and small mononuclear leuco- or entire period of observation.

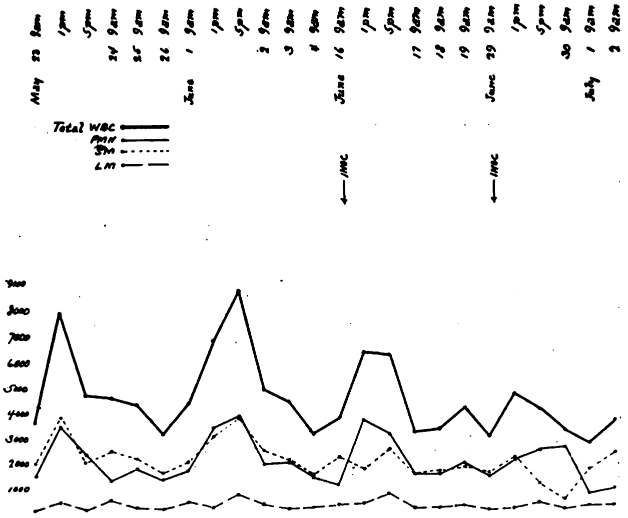


CHART XX.

Rabbit No. 108 showing total leucocyte counts and absolute values of polymorphonuclear, large and small mononuclear leucocytes for entire period of observation.

Rabbit No. 107—Cont.

	Total Leucocytes	Pmn %	Pmn Total	Lm %	Lm Total	Sm %	Sm Total	Eos %	Eos Total	Mst %	Mst Total
June 1, 9 a. m.	5180	43.5	2253	6.0	311	45.5	2357	1.5	78	3.5	181
1 p. m.	5940	38.5	2287	10.5	624	49.0	2910	..	..	2.0	119
5 p. m.	6960	48.5	3375	5.5	383	37.5	2610	0.5	35	8.0	557
2, 9 a. m.	4040	35.5	1434	4.5	182	50.5	2040	1.0	40	8.5	343
3, 9 a. m.	5260	16.0	842	8.0	421	70.0	3682	0.5	26	5.5	289
4, 9 a. m.	5000	41.0	2050	4.5	225	49.0	2450	..	..	5.5	275
June 16, 9 a. m.	5200	33.0	1716	5.0	260	55.5	2886	0.5	26	6.0	312
(Inoc. 2.5 cc. serum intravenously.)											
1 p. m.	7140	30.0	2142	4.0	286	62.5	4462	0.5	36	3.0	214
5 p. m.	6860	37.0	2538	6.5	446	46.0	3156	..	..	10.5	720
17, 9 a. m.	5020	34.0	1707	7.0	351	53.0	2661	..	..	6.0	301
18, 9 a. m.	3420	37.5	1283	7.0	239	51.5	1761	..	..	4.0	137
19, 9 a. m.	3860	45.5	1756	11.0	425	34.0	1312	..	..	9.5	367
June 29, 9 a. m.	4300	35.0	1505	7.5	323	51.0	2193	..	..	6.5	279
(Inoc. 0.01 cc. serum intradermally.)											
1 p. m.	1800	..	..	..	..	..	..	..	..	..	..
5 p. m.	6780	49.0	3322	6.0	407	39.0	2644	..	..	6.0	407
30, 9 a. m.	8070	35.0	2824	8.0	646	52.0	4196	0.5	40	4.5	363
July 1, 9 a. m.	4960	52.0	2579	5.0	248	40.0	1984	..	..	3.0	149
2, 9 a. m.	4140	35.5	4170	7.0	290	53.0	2194	1.0	41	3.5	145
Rabbit No. 108											
May 23, 9 a. m.	3600	40.0	1440	4.0	144	54.0	1944	1.0	36	1.0	36
1 p. m.	7920	43.5	3445	5.5	436	48.0	3801	0.5	40	2.5	198
5 p. m.	4700	51.5	2420	4.0	188	43.0	2021	..	..	1.5	71
24, 9 a. m.	4540	28.5	1294	12.5	567	54.5	2484	..	..	4.5	204
25, 9 a. m.	4280	40.5	1733	6.0	257	51.5	2204	0.5	21	1.5	64
26, 9 a. m.	3160	41.0	1296	6.0	190	48.5	1532	2.0	63	2.5	79
June 1, 9 a. m.	4420	39.2	1654	10.8	456	46.8	1975	0.8	33	2.4	101
1 p. m.	6840	49.5	3386	4.0	273	44.5	3044	1.0	68	1.0	68
5 p. m.	8700	44.5	3871	8.5	739	43.5	3784	1.5	131	2.0	174
2, 9 a. m.	4920	39.0	1919	8.5	418	50.5	2484	0.5	25	1.5	74
3, 9 a. m.	4380	44.5	1949	4.0	175	47.0	2059	..	..	4.5	197
4, 9 a. m.	3120	43.0	1341	8.0	250	46.0	1435	..	..	3.0	94
June 16, 9 a. m.	3740	30.0	1122	8.5	318	59.0	2206	0.5	19	2.0	75
(Inoc. 5.0 cc. serum intravenously.)											
1 p. m.	6340	58.0	3677	6.5	412	26.5	1680	0.5	32	8.5	539
5 p. m.	6260	49.5	3099	12.0	751	36.0	2254	..	..	2.5	156
17, 9 a. m.	3140	45.5	1429	6.5	204	45.5	1429	0.5	16	2.0	62
18, 9 a. m.	3320	43.5	1444	5.5	183	47.5	1577	..	..	3.5	116
19, 9 a. m.	4080	46.5	1897	6.5	265	43.0	1754	1.0	41	3.0	122
June 29, 9 a. m.	3020	45.0	1359	2.5	75	50.0	1510	0.5	15	2.0	60
(Inoc. 0.01 cc. serum intradermally.)											
1 p. m.	4660	43.0	2004	4.5	210	46.5	2167	3.5	163	2.5	116
5 p. m.	4040	60.5	2444	10.0	404	27.5	1111	0.5	20	1.5	60
30, 9 a. m.	3260	78.0	2543	3.0	98	13.5	440	0.5	16	5.0	163
July 1, 9 a. m.	2760	25.5	704	9.5	262	61.0	1683	0.5	14	3.5	96
2, 9 a. m.	3620	25.5	923	6.5	235	64.0	2317	1.0	36	3.0	108

Chart XVI shows the total leucocyte counts for the entire series plotted out so that a general idea of the variations which have taken place can be gotten at a glance.

One sees that the leucocytes underwent as great changes in number during the two series of observations before inoculation as they did after inoculation. On May 23, June 1, 16 and 29, days on which counts were made at 9 a. m., 1 p. m. and 5 p. m., it is to be observed that the 1 p. m. count, or the 5 p. m. count, or both, are higher than the 9 a. m. count. This we ascribe to a digestive leucocytosis as in the preceding series, the animals being fed at 10 a. m. each day. We are unable to see that the intravenous injection of normal horse serum exerted any influence on the total number of leucocytes. It is possible that the depression of the digestive leucocytosis which is observable on June 29 may have been due to the intradermal inoculation.

Charts XVII, XVIII, XIX and XX show the total leucocytes and absolute values of the differential counts plotted out for rabbits Nos. 105, 106, 107 and 108, respectively. They illustrate very well the observation made in connection with the preceding series; namely, that both the polymorphonuclear and small mononuclear leucocytes participate in an increase in the total number of leucocytes, but in this series the small mononuclears, as a rule, participate to a greater extent than do the polymorphonuclears.* It is possible that the exception to this rule observable in Charts XVIII and X June 16, 1 p. m., where we see a relatively greater incre in the polymorphonuclear cells may have been due to th travenous injection of normal horse serum, but inasmu similar exceptions are to be seen elsewhere in the charts w no horse serum was inoculated, it would hardly be saf draw conclusions from these two instances.

Curves showing the total number of polymorphonu leucocytes for the entire series were superimposed for purp of comparison and the same was done for the small m nuclears, but as the injection of serum seems to have b entirely without influence on either of these elements charts are omitted.

SUMMARY.

We have thought it worth while to publish these studi full, giving the detailed counts for each series, since t represent a large number of carefully made observations a the data may be useful to others who are attempting to d conclusions from variations of the leucocyte counts in ra

We feel justified in saying that the normal variation in t total leucocyte count taken at the same hour each da rabbits kept as nearly as possible under constant condi is very great, at times reaching nearly 100 per cent.

We have observed quite regularly a diurnal cycle in w we are inclined to ascribe the increase in the number of le cytes to the influence of digestion.

The relative and absolute values of the differential c vary under normal conditions from day to day and at diffe hours of the same day.

We observed that an increase in the total leucocyte c was participated in, as a rule, by both the polymorphonu and small mononuclear leucocytes, but usually by the latter a greater extent than by the former.

The relative values (percentage values) of the poly phonuclear and small mononuclear leucocytes bear a recipro relation to each other; that is, an increase in the percenta of one is accompanied by a decrease in the percentage of other.

We were unable to observe that the intravenous injectio normal horse serum in doses varying from 0.1 cc. to 5 cc the intradermal injection of 0.01 cc. normal horse serum either sensitized or non-sensitized rabbits had any defini constant influence on the total or differential leucocyte cou three hours or longer after injection.

We have a few observations, not included in this pa where counts were made at short intervals (5-10 minutes) af the intravenous injection of large amounts (10 cc.) nor horse serum into rabbits. These indicate, as far as the that shortly after injection the total count undergoes a sh decline with a marked relative increase of polymorph clear and decrease of small mononuclear leucocytes. Th observations, however, were few in number and we hesita draw conclusions from them.

---

* These results are in entire agreement with those obtained in a fourth series of counts which are not included in this report on account of lack of space.

THE TUBERCLE BACILLUS.

By W. W. Boardman, M. D.

(From the Research Laboratory, The Phipps Tuberculosis Dispensary, The Johns Hopkins Hospital.)

n absolute diagnosis of pulmonary tuberculosis can be d upon one, and only one finding—the demonstration of ercle bacilli in the sputum. Yet in a review of the reports arious tuberculosis dispensaries and sanatoria we find that he cases clinically diagnosed as definite pulmonary tuberosis, the sputum is negative for tubercle bacilli in from 46 per cent. Are we to conclude then, that in from 8 to er cent of our clinically positive cases, there are no tubercle lli in the sputum, and that these cases therefore are ligible factors in the spread of the disease; or that in a e proportion of these cases we fail to demonstrate tule bacilli, not because of their absence, but as a result of imperfect methods of sputum examination, or our too less use of these methods?

s to the first possibility; clinically positive cases without ercle bacilli in the sputum do exist among the arrested s and possibly in the very early stages of the disease, but e is no doubt that the number of cases so classed at the ent time is too large.

he second possibility seems a more probable explanation. fail to find tubercle bacilli in the sputum of many cliniy positive cases, since (a) the specimen examined may con no tubercle bacilli, being merely mucus from the upper passages; or (b) if the tubercle bacilli are present in but ll numbers, they may be overlooked, even in the most careexamination by the ordinary methods. This point is well strated by the following report by Goerres. In examining smears from each of 296 specimens—96 were demonted to contain tubercle bacilli by the first smear, 24 more the second, 9 more by the third, and 5 more by the th, and yet of the remaining 162 apparently negative a, 28 were demonstrated to contain tubercle bacilli by the formin method. Finally (c) as to the careless use of present methods, it is evident, that if some cases escape ction even with repeated smear examinations, many may e detection when but a single smear is made.

hat then is the solution of the problem? It is evident we must first obtain a specimen from the tuberculous n; again we must examine several smears from the same men; and lastly we must examine repeated specimens. observance of these rules calls for the expenditure of time and energy, and in return, although the results fairly accurate, they still are far from perfect.

more nearly absolute method, first proposed by Biedert[1] slightly modified by subsequent investigators (Goerres[2]) long been recognized as a valuable procedure, but the us technique has prevented its use except in a compara few doubtful cases. Briefly, the method is as follows: large quantity of sputum is well diluted with distilled and 0.2 per cent sodium hydroxide is added, the material heated, stirring meanwhile, until a homogeneous solution results. It is then neutralized with acetic acid, and double the amount of 96 per cent alcohol added. It is then allowed to settle, the supernatant fluid is poured off and the sediment examined in the usual way. This method facilitates the finding of the bacilli by concentrating them in the sediment.

Following Biedert's first publication various agents were recommended for dissolving the mucus, such as hydrogen peroxide, carbolic acid, and pancreatic ferment, but none of these give so satisfactory results as the weak solution of sodium hydroxide with heat.

Thus matters stood until in the latter part of 1908, when Uhlenhuth[3] reported the results of his extensive researches with antiformin, a preparation much used by brewers in the disinfection of their fermentation vats and pipes.

Antiformin is a clear yellowish liquid of high specific gravity, possessing a faint chlorine odor and a decided soapy feel. According to Uhlenhuth it is composed of sodium hydroxide 7.5 per cent with sodium hypochlorite in such amount that 100 grams of antiformin liberates five and three-tenths grams of chlorine gas. After months of standing in the laboratory there is no appreciable deterioration.

As a result of his researches Uhlenhuth recommends antiformin as a disinfectant of the first rank, surpassing in many respects carbolic acid and bichloride of mercury. Its efficiency depends upon an intensive oxidation process, this being so marked that practically all organic matter except hair, wax, fat and cellulose, is rapidly brought into solution—the rate and completeness depending upon the strength of the solution used and the temperature at which the reaction occurs.

Upon adding a solution of antiformin to sputum, there is a marked liberation of gas. The sputum rises to the top of the mixture and rapidly dissolves, the result being a practically homogeneous solution, varying in color from yellowish-brown to a pale yellow, with but a small amount of flocculent sediment. The consistency of the resulting liquid varies directly with the consistency of the original specimen. The sediment varies in color from white to a dirty gray and consists of a finely granular detritus, fat needles, dust particles, cellulose fiber and any acid-fast organisms which may have been present in the original specimen.

A similar reaction occurs upon adding antiformin to finely divided animal tissues, pus, feces, suspensions of bacteria, etc. Uhlenhuth concludes that with the exception of one group of bacteria, all bacteria, protozoa, spirochætæ, and trypanosoma are dissolved in 2 to 5 per cent antiformin solution in from two and one-half to five minutes, the majority of them undergoing almost instantaneous solution. The organisms of the acid-fast group are the only ones resisting the dissolving action of the antiformin solutions and this is explained by the fact that they are enveloped in a waxy capsule. Further work by Uhlenhuth and others revealed the important fact that tubercle bacilli, as shown by animal experimentation, are rapidly killed by antiformin only in 50 per cent or stronger solutions; that they retain their virulence for 12 days in 8 per cent solutions and for 4 days in 20 per cent solutions; finally that their staining properties are practically unaffected by exposure to 50 per cent antiformin for weeks.

We therefore have in antiformin an agent capable of rapidly and completely reducing sputum to a practically homogeneous solution without altering the staining qualities or viability of the contained tubercle bacilli. Several methods have been proposed for the recovery of the bacilli from these solutions, thereby making the procedure of practical value.

Uhlenhuth recommends simple sedimentation, his method for sputum examination being briefly as follows:

1. 15-30 cc. of sputum in a conical settling glass.
2. Add from three to five times the volume of water.
3. Add sufficient antiformin to make a 15 per cent solution.
4. Stir thoroughly and allow to digest and settle completely.
5. Pour off supernatant fluid.
6. Wash sediment with sterile water and allow sediment to reaccumulate.
7. Pour off supernatant fluid; smear sediment on slide and examine in usual manner.

The washing was found necessary since the presence of any considerable quantity of antiformin prevented firm fixing of the sediment to the slide.

Hüne[4] uses both the gravity sedimentation and the centrifuge. He proposes two distinct methods, as follows: *

I.

1. To a large quantity of sputum add antiformin to a 25 per cent solution.
2. After the production of a homogeneous solution add 96 per cent alcohol, thereby reducing the specific gravity and hastening sedimentation.
3. Pour off supernatant fluid.
4. Wash sediment in centrifuge.
5. Smear and examine.

II.

1. Take equal parts of sputum and sterile water.
2. Add antiformin to 2 per cent solution.
3. Allow to digest and sediment to accumulate.
4. Pour off supernatant fluid and smear directly.

In II washing is not necessary owing to the low percentage of antiformin; on the other hand, this process requires about three days for completion.

Meyer[5] also proposes two methods practically identical with the preceding:

I.

1. To the sputum add antiformin to a 20 per cent
2. Transfer the entire resulting solution to centrifug and centrifugalize violently.
3. Wash sediment twice in centrifuge.
4. Smear and examine.

II.

1. To the sputum add antiformin to 3 per cent solu examine sediment without washing.

Seeman[6] uses either the centrifuge method or gravity mentation. He also does away with the necessity of the sediment by using either diluted egg albumin or some of the original sputum to aid in fixing the smear.

METHOD.

1. To the sputum add antiformin to a 15-20 per cen tion.
2. Add 96 per cent alcohol after digestion is complet
3. Smear sediment directly, using either egg albumi some of the original sputum; or
2. Centrifuge the material.
3. Smear as in 3.

In using some of the original sputum to aid in fixing smear, Seeman not only does away with the necessity of ing the sediment, but at the same time gains some in into the general composition of the sputum, as regard number and character of the other organisms, the type predominating, and the presence or absence of elastic and also renders the search for the tubercle bacillus easier by having the blue field upon which to focus.

Thilenius[7] uses the centrifuge after first having added hol to the sputum-antiformin mixture. He also uses formin in from 10-50 per cent solution.

Haserodt[8] recommends the use of ligroin, a light carbon oil, for obtaining the tubercle bacilli. His meth as follows:

1. To the sputum add antiformin to make 5 per cent tion.
2. Add a few cubic centimeters of ligroin and shake emulsion is produced.
3. Allow to stand until a sharp line of separation between the ligroin and the sputum-antiformin mixture.
4. With platinum needle remove several loopsful of mate from just below the ligroin; spread this on a slide and amine in the usual manner.

The tubercle bacilli and other undissolved particles in mixture are carried upward by the little droplets of and deposited just below the line of separation between two solutions. Haserodt claims that the smears, by method, show no tendency to wash off the slides, but this ment is not upheld by other investigators. The method no advantage over the previous ones, and has failed to as good results.

Bernhardt's[9] procedure is exactly the same as Haserod except he uses 5 cc. of sputum and adds 20 cc. of a cent solution of antiformin.

---

* Hüne substituted a mixture of sodium hypochloride 11.1% and potassium hydroxide 5.6% for antiformin with satisfactory results.

.. Equal parts of sputum and water.
:. Add antiformin to a 25 per cent solution, shake vio-
tly.
3. After 4-6 hours gently turn vessel to dislodge any par-
es which may be adhering to the side of the vessel.
t. Allow to settle for several hours.
. Pour off supernatant fluid.
;. Fix sediment to slide with egg albumin or some of the
ginal sputum.

The conclusions, finally reached from a review of the sev-
l articles dealing with the use of antiformin in sputum
minations, may be briefly summarized as follows:
. Large quantities of sputum should be used.
. Sputum should be diluted with sterile water.
:. Antiformin should be used in from 15-25 per cent
itions.
. The sputum is dissolved in from 10-45 minutes—the
illi, however, are uninjured after days of exposure in these
itions.
. The resulting solutions should be watery in consistency
either colorless or pale yellow—if need be, more water or
e antiformin may be added.
. The tubercle bacilli may be obtained from the solution
er by gravity sedimentation, by centrifugalization, or by
use of ligroin. Sedimentation may be facilitated by the
ition of alcohol to lower the specific gravity. Of these
ral methods, gravity sedimentation is perhaps most used.
. Washing of the sediment is unnecessary if egg albumin,
ited with 10 parts of water, plus 1 per cent formaldehyde;
ome of the original sputum be used to fix the smear.
. The smear stains perfectly by the Ziehl-Neelsen method.
. In examining the smears one may find acid-fast rods
ch are to be differentiated from the tubercle bacillus by
g larger, and straighter, and especially by the fact that
readily transmit light. These rods are probably fat
lles, as suggested by Goerres.
). In the entire smear there may be only two or three
lli—but these are sufficient for a positive diagnosis.
l. Finally, by the use of antiformin in the examinations
putum for tubercle bacilli one is enabled to demonstrate
ı in from 7.3 to 17.2 per cent of the specimens reported
gative after careful smear examination by the old method.
may be seen in the following reports:
eyer (*loc. cit.*) in examining 113 sputa, found 14 posi-
by the ordinary smear examination. Of the remaining
o-called negative specimens, 14 or 14.1 per cent were
nstrated to contain tubercle bacilli by the antiformin
od.
ıserodt (*loc. cit.*), in 340 examinations, classed 300 as
tive after careful examination by the ordinary method.
e antiformin method 22 or 7.3 per cent of these negative
were shown to contain tubercle bacilli.
erres (*loc. cit.*), in 296 examinations by the ordinary
od, found 162 negative; 28 or 17.2 per cent of these were
tely positive by the antiformin method.

Some months ago the writer undertook a study of the antiformin method of sputum examination to determine its value and limitations.

After trying various procedures, the following was finally adopted as the most satisfactory both as regards method and results.

1. Place the entire 24 hours' sputum in a conical settling glass; if the amount be excessive it is perhaps better to use only 15-20 cc.
2. If the specimen is thick, add an equal volume of distilled water. Less tenacious specimens do not require so much dilution.*
3. Add an amount of antiformin equal to one-fourth the volume of the diluted sputum; in other words, sufficient to make a 20 per cent solution.
4. Stir thoroughly, thereby breaking up the masses of mucus and greatly hastening complete solution.
5. Allow to stand till solution appears homogeneous. It should now be watery in consistency and pale yellow in color; if necessary, more water or more antiformin should be added and digestion allowed to continue. This will usually require from a few minutes to an hour, but may be allowed to continue for days with no resulting harm to the tubercle bacilli.
6. Add an equal volume of 95 per cent alcohol. By this procedure the specific gravity is reduced from about 1.030 to below 1.000; thereby not only hastening sedimentation, but making it more complete.
7. After stirring, allow to stand till sedimentation is complete. This will occur in 2-4 hours, but a period of 12-24 hours is recommended. During this sedimentation it may be necessary to gently turn the vessel to dislodge little particles of sediment which may be adhering to the sides of the vessel.
8. Pour off this clear supernatant fluid.
9. Make smear from the sediment on a glass slide, using some of the original sputum to aid in fixing the smear. This is best done by making a smear from the sputum before antiformin is added and afterwards spreading the sediment from the sputum-antiformin mixture on the same slide. Stain and examine in the usual way.

If one has the proper laboratory facilities the centrifuge may be used to hasten the work, or to remove the last trace of doubt as to the accuracy of the results; but from the reports of the other observers and my own exeprience, if tubercle bacilli are present, they will appear in the sediment obtained after adding alcohol. The use of the centrifuge merely shortens the time element, but in so doing adds much to the difficulties of the method.

Antiformin has been used in the examination of 103 sputa. Twenty specimens were obtained from the patients at Eudowood Sanitarium through the courtesy of Dr. Sloan, three from the Epstein Hospital, through the courtesy of Dr. Grover, and the remaining from the patients in attendance at the Phipps Dispensary of the Johns Hopkins Hospital. For the collection of the sputum wide-mouthed bottles of 100 cc. capacity were used, these being carefully washed in distilled water before being distributed. The patients were instructed to expectorate directly into the bottles, beginning with the first morning expectoration and continuing to use the bottles for the next 24 hours, or until they had accumulated from 15-20 cc. of sputum. However be it here noted that in this regard the results were very disappointing, as the dispensary patients frequently returned the bottles with but two or three cubic centimeters of sputum and in many cases this was without doubt entirely from the upper air passages. The results from the sanitaria were more satisfactory.

---

* Here it might be well to make sure that the distilled water harbors no acid-fast organisms.

Dividing the cases examined according to the clinical diagnosis, 73 were definite pulmonary tuberculosis, 6 were probable pulmonary tuberculosis, 16 were doubtful pulmonary tuberculosis and 8 were definitely non-tuberculous.

By the old method all the sputa of the non-tuberculous, doubtful and probable groups, 30 in number, were negative. Of the 73 clinically positive cases, 31 showed tubercle bacilli in the smears examined.

By the antiformin method the examination of the same specimens showed no tubercle bacilli in any of the non-tuberculous, doubtful or probable cases. In the 31 cases positive by the old method great enriching was seen. In the ordinary smear an average of 25 bacilli could be counted in two minutes. In the antiformin smear an average of 138 tubercle bacilli could be counted in the same space of time. Of the 42 remaining specimens from clinically positive cases which, by ordinary smear examination, were negative for the tubercle bacillus, seven or 16.6 per cent were demonstrated to contain the bacillus by the antiformin method; or considering al positive, probable and doubtful cases, a total of 95; 64 negative by the old method, but 10.9 per cent of these demonstrated to contain tubercle bacilli by the antifor method.

I therefore feel fully justified in heartily recommen the use of antiformin in the examination of sputum tubercle bacilli, not only in hospitals and dispensaries, in the laboratory of every private physician. The gen adoption of this method, combined with repeated exami tions, will do much towards reducing the percentage of clinically diagnosed as definite pulmonary tuberculosis which however an *absolute* diagnosis cannot be made. Of greater value than the finding of tubercle bacilli in the spu of cases clinically diagnosed as definite pulmonary tuber losis, is the possibility which this method offers of dem strating bacilli in the cases still classed as only probable doubtful, thereby enabling us to enforce a vigorous and sys matic treatment at a time when such treatment is of avail.

LITERATURE.

1. Berl. klin. Wchnschr., 1886, XXiII, 713-717.
2. Ztschr. f. klin. Med., 1910, LXX, 86-101.
3. Berl. klin. Wchnschr., 1908, XLV, 1346-1349.
4. Deutsche med. Wchnschr., 1909, XXXV, 1791-1793.
5. Tuberculosis, 1909, VIII, 71-75.
6. Berl. klin. Wchnschr., 1909, XLVI, 628.
7. Berl. klin. Wchnschr., 1909, XLVI, 615; 1169.
8. Hyg. Rundschau, 1909, No. 12.
9. Deutsche med. Wchnschr., 1909, XXXV, 1428-1429.

SERUM TREATMENT OF HEMORRHAGIC DISEASES.

By W. L. Moss, M. D.,
Associate in Medicine, Johns Hopkins University,

AND

J. Gelien, M. D.

(From the Research Laboratory, The Phipps Tuberculosis Dispensary, The Johns Hopkins Hospital.)

Under the designation "Hemorrhagic Diseases" is grouped a number of widely different morbid conditions, having hemorrhage as a common feature. The bleeding varies in location and in severity from insignificant cutaneous hemorrhages in mild cases of purpura, to appalling and even fatal losses of blood in more serious conditions.

An enumeration of the diseases with which hemorrhage is, or may be associated and which are sometimes designated as hemorrhagic diseases includes:

Hemophilia, hereditary and spontaneous.

Hemorrhagic diseases of the new-born, of which there are doubtless several forms.

Purpuras, acute, chronic, simple, rheumatic, senile, etc.

Jaundice.

Grave anemias.

A heterogeneous group, including nephritis, typhoid, other severe infections.

Is hemorrhage in these conditions dependent upon a com mon cause or are different factors operative? At present are unable satisfactorily to classify hemorrhagic diseases we do not know the causes of the hemorrhagic diathesis. in order to study this subject intelligently, a consideration the theories of the coagulation of normal blood is necessa There are almost as many theories concerning coagulation there are investigators in this field. If we content ourse with stating the points upon which all are agreed our task easy. The coagulation of the blood depends upon the act of fibrin ferment, which normally is formed only after blood is shed, on fibrinogen, which exists as such in the culating blood. This much is fairly simple. Fibrinogen ıd its characteristics are fairly well determined. The part plays in coagulation is known, but since hemorrhage is a ıthological condition and coagulation does not take place ıder normal conditions, this action of fibrinogen can scarcely taken as representing a normal function. Concerning its igin, the use to which it is put under normal conditions, and s fate in the body, we know little with certainty. The origin ıd mode of action of fibrin ferment is enveloped in still eater obscurity, although something is known of the finished oduct itself.

The term fibrin ferment is now used less than formerly, as ıe ferment nature of this body has been seriously called into ıestion. Thrombin, as it was designated by A. Schmidt, has en isolated in approximately pure form and its properties udied by Howell.[1] Thrombin added to a solution of fibrino- n, causes coagulation by the formation of fibrin. Thus we ıve as factors in the much studied coagulation of the blood o substances, fibrinogen and thrombin which together form rin, the essential feature of the blood clot. Not only is the igin of thrombin the subject of many conflicting theories, ıt also the mode of action of thrombin on fibrinogen in the oduction of fibrin. Whether it is a ferment, a chemical, or physico-chemical action is still undetermined.

Thrombin does not exist as such in the circulating blood, ıt since normally it appears within a few minutes after the ood is shed, it seems evident that all of the constituents ıich enter into its formation must be present in the blood fore it is shed. Most theories concerning coagulation postu- te, therefore, as a normal constituent of the blood, a mother bstance of thrombin, usually designated prothrombin or rombogen. While there can scarcely be a doubt as to the istence of prothrombin, it has never been identified or iso- ed. To account for the conversion of prothrombin into the tive substance, thrombin, the presence of a ferment has n assumed, and to this ferment Morawitz gives the name rombokinase. Since it has been found that blood does not ıgulate if the calcium which it contains is precipitated in oluble form as soon as the blood is shed, soluble calcium ts have been recognized as essential to the action of throm- inase in converting prothrombin into thrombin. This ıase has never been isolated and its existence is really a mat- of theory. Calcium salts of course do exist in the blood l their presence can be quantitatively determined, but the ct part they play in coagulation remains a subject of con- versy.

ther substances which have been postulated in various ories to account for the coagulation of the blood, such as ombozym, zymoplastic substances, etc., need not be con- red here, but it is necessary, for the purpose of this paper, o one step further into the theories concerning the forma- ı of thrombin. We may accept as a necessary part of any ry, the existence of prothrombin normally in the circulat- blood. Something happens when the blood is shed which ses the prothrombin to pass over into thrombin and since have no more satisfactory explanation of this transforma- ject. There is one change in the blood which we know begins to take place as soon as it is shed, and this is the disintegration of the platelets, and less rapidly, the disintegration of the leucocytes. It is not unnatural, therefore, that investigators have sought the origin of thrombokinase in these elements.

We have attempted to develop from the literature, a more or less general and somewhat composite theory of coagulation. It serves to illustrate the highly speculative character of much that is held concerning this important phenomenon and indicates the difficulties to be overcome in arriving at the etiology and classification of the hemorrhagic diseases.

Hemophilia is the most striking and most interesting disease in this group and it is natural that it should have been most studied. To account for the hemorrhages many theories have been advanced. These vary from such simple explanations as abnormal thinness of the blood vessel walls, leading to rupture under slight provocation; abnormally high blood pressure; a disproportion between the total amount of blood and the total capacity of the vascular system; to such profound and obscure explanations as that "in hemophilia we have to do with an inherited chemical (fermentative) degeneration of the protoplasm of the formed elements of the blood, and perhaps of the whole organism" (Morawitz and Lossen[2]).

It is not necessary to enter into a discussion of the various explanations which have been offered for the hemorrhage in hemophilia and other hemorrhagic diseases. Some have thought that there is a lack of one or more of the factors normally present and concerned in bringing about coagulation; others have considered that there are present in the blood of these patients abnormal substances which are antagonistic to coagulation. Thus a lack of fibrinogen, of available calcium salts, of prothrombin, of thrombokinase, or of the elements from which thrombokinase is supposed to arise, on the one hand, and antithrombin and other anticoagulants on the other hand, have been held responsible for the failure of the blood to coagulate. Thus it may be seen that until more exact information is obtained as to the cause of the hemorrhagic diathesis any measure directed towards its treatment other than mechanical must be largely empirical.

When one comes to consider hemostatic measures one finds a long list for disposal. Excluding the direct measures, ligation, tamponading, etc., which are applicable to accessible hemorrhages in normal individuals, less successfully oftentimes in those with a hemorrhagic diathesis, we have the following: administration of calcium salts to increase the coagulability of the blood; injection of gelatin to increase its viscosity; administration of adrenalin to narrow the vessels. Unfortunately, the latter drug raises blood pressure, unless applied merely locally and while the local application does sometimes arrest hemorrhage, its use is accompanied by the danger, that if the hemorrhage does not cease entirely during the time the vessels are constricted, it is apt to become more profuse upon the subsequent dilatation, which occurs after the constricting action passes off.

Ergot probably has little value as a hemostatic aside from its use in obstetrics.

Other drugs which are classed as hemostatic are ferric chloride, silver nitrate, hydrastin, hydrastinine, gallic acid, lead acetate, etc. None of these, however, have proven very successful in the conditions under discussion.

Recently the treatment of hemorrhagic diseases has attracted renewed attention. It is to the investigations of Weil that the present trend of the work is usually ascribed. In 1905 he published his investigations concerning the pathogenesis and serotherapy of hemophilia,[3] which have been followed by numerous papers by himself and others.[4, 5, 6, 7, 8, 9]

Weil's work may be very briefly summarized as follows: The hereditary and spontaneous forms of hemophilia can be differentiated in origin, severity of clinical manifestations, character of the blood and its mode of coagulation. (The faulty coagulation in the hereditary form is referred to the presence in the blood of anticoagulants; in the sporadic form, to the absence of substances normally present and essential to coagulation. He considers the changes of the blood in marked hemorrhagic conditions as analogous to, but not identical with, those of hemophilia and recommends, as a cure for the sporadic type of hemophilia and for many of the other hemorrhagic states and as the best therapeutic agent available in the treatment of hereditary hemophilia, subcutaneous injections of 30 cc. or intravenous injections of 15 cc. fresh human or animal serum. Eliçagaray[10] confirms Weil's work.

Baum[11] repeated much of Weil's experimental work, most of which he was unable to confirm. In reviewing his experience he states that he was much encouraged by his first case in which local applications of serum apparently stopped the hemorrhage, following the extraction of a tooth, in a hemophilic. In his succeeding cases, however, and in his animal experiments local applications of serum seemed entirely without effect. As to injections he found that in hirudinized rabbits, the coagulation time was much reduced by injections of serum, except in cases in which the blood had been rendered incoagulable to a marked degree by hirudin.

Baum treated three cases of hereditary hemophilia by means of serum injections with negative results, but thinks that in other hemorrhagic conditions good results may follow its administration.

Trembur[12] reports one case of hemophilia successfully treated by injections of sheep and rabbit serum.

Lommel[13] reports the successful treatment of hemorrhages in a four-year old hemophilic by the use of subcutaneous injections and local applications of antistreptococcic serum.

Class[14] reports one case of purpura hemorrhagica, which he considered cured by injections of antidiphtheritic serum.

Leary[15] reports a series of twenty cases treated by means of serum injections. His cases may be summarized as follows:

1. Jaundice, nine cases. The first case did not receive serum until after the hemorrhage had set in, following an operation. This patient died. Each of the remaining eight cases received before operation, as a prophylactic measure, 30 cc. rabbit serum subcutaneously. All but one of these recovered with but little bleeding following the operation. In the fatal case the author ascribes the death not to hemorrhage but to cholemia.

2. Hemorrhage of the new-born, three cases, two recovered, one death.

3. Hemophilia, one case received diphtheria antitoxin, rabbit serum, and finally direct transfusion of human blood. Patient regained health rapidly.

4. Purpura, one case, cured.

5. Post operative hemorrhage, two cases, one cured, one died.

6. Uterine hemorrhage, one case, cured.

7. Typhoid fever hemorrhage, two cases, cured.

8. Ruptured tubal pregnancy (operated) one case, cured.

Among others who speak favorably of the use of serum injections in the treatment of hemorrhagic diseases is Welch who reports twelve cases of hemorrhage in the new-born, [illegible] of which he claims were cured by subcutaneous injections of fresh human serum. He injected as much as 209 cc. in [illegible] days, but averaged about 80 cc., in 10 cc. doses, extending over four days.

Schockaert[17] used subcutaneous injections of antistreptococcic serum successfully in two cases. One was a very anemic patient who bled profusely under operation. Fifty cubic centimeters of serum were injected and the author reports that immediately the hemorrhage stopped, so that the operation could be concluded with a dry field of operation. The second case was one of rebellious menorrhagia which resisted hydrastis, ergot, stipticine, etc., but was controlled by injections of 10 cc. of antistreptococcic serum at the beginning of the menstrual periods.

Chabrol[18] reports the successful serum treatment of a case of rheumatic purpura accompanied by intestinal hemorrhages which resisted ordinary treatment, calcium chloride, gelatin, ergot, etc. He gave daily injections of 10 cc. diptheria antitoxin subcutaneously for five days.

Bigelow[19] reports successful treatment of three cases of hemorrhagic disease of the new-born. He states that two of the cases were moribund when treatment was instituted, calcium lactate and epinephrin having been tried without benefit. The hemorrhages ceased after subcutaneous injections of 5 cc. fresh rabbit serum.

Busse[20] reports the use of fresh human serum in the treatment of 10 cases of uterine hemorrhage. The dose employed was 10 cc. injected intragluteally. Five of his cases he regarded cured, four were still under treatment at the time of his report.

A smaller number of reports have appeared in which the value of serum injections in hemorrhagic disease is denied. The authors of these reports usually advocate the use of injections of defibrinated blood instead of serum or else the direct transfusion of human blood. Thus Schwartz and Ottenberg[21] report the case of a child 11 days old with melena, hematemesis, hemorrhages from the nose and mouth, icterus and ecchymoses. One injection of horse serum (not fresh ed to have immediately stopped. After some days, how- , bleeding recurred and the patient died.

:osenthal [22] reports a case of melena neonatorum cured by ct transfusion.

vain, Jackson and Murphy [23] report a case of melena iatorum unbenefited by 75 cc. of fresh rabbit serum subneously and an injection of diphtheria antitoxin. Direct sfusion from the child's father was followed by complete ition of the hemorrhage.

ambert [24] reports a case of melena neonatorum in which sfusion was performed after the hemorrhage had been g on for three days and the child was in a dying condi- . An immediate and permanent cure is said to have re- :d.

urphy [25] reports the case of a woman 48 years old, who for 'ears suffered attacks of abdominal pain, jaundice, clay 'ed stools and finally a very severe attack accompanied by orrhages from the nose and rectum. Injection of 30 cc. : serum was without effect. Injection of 30 cc. fresh rabbit m seemed to control the hemorrhages to a degree, but still bleeding continued to an alarming extent. Coagulation 13 minutes (Brodie-Russell). The patient was then sfused, her husband being the donor. Twelve hours after sfusion the coagulation time was 3-4 minutes and on the wing day the patient was successfully operated on for stones, and was cured.

ike [26] considers that the tendency to uncontrollable bleed- in at least some of the hemorrhagic diseases is due to a nished number or to an absence of blood platelets. He :fore advocates transfusion as the only means of supply- :he deficit and reports several cases which he considers to been greatly benefitted by this procedure.

om this review of the literature, which is by no means plete, it is apparent that any treatment of these alarming oftentimes dangerous conditions can be only empirical, the cause of the disorder is determined. Meanwhile the f serum injections, the injections of defibrinated blood, direct transfusion seem to have yielded better results any other measures. As to the choice between these procedures, doubtless direct transfusion would be the method were it not for the technical difficulties.

to the intravenous introduction of defibrinated blood or gn serum, one perhaps must feel some apprehension of :r, but the condition to be combated is a dangerous one ustifies, in the present state of our knowledge, the risk ay run in carrying out these procedures. Moreover, :tically the danger from agglutination in transfusion is ps as great as the danger from thrombosis or hemolysis, ing the injection of defibrinated blood or foreign serum. ' as we are aware no untoward results of a serious nature een reported to follow the latter two measures. Finally, it may be true that certain of the hemorrhagic diseases d upon a lack of blood platelets and that this deficit can e supplied by direct transfusion, still it is more prob- checking of hemorrhage, but products which are set free on their disintegration. These products are doubtless furnished just as well in serum or defibrinated blood as in the whole blood. It would seem that injections of serum or of defibrinated blood would answer as well as direct transfusion in all cases except those—if clinically there are such—which depend upon a lack of fibrinogen.

A consideration of great practical importance is, that in the case of injections of serum or of defibrinated blood one knows certainly that he gets the injection into the patient and one can accurately gauge the amount introduced, while in transfusion, except in the hands of an expert surgeon, there is much uncertainty of transferring any blood at all, and in no case can the amount transferred be satisfactorily determined.

Our series consists of six cases admitted to the wards of the Johns Hopkins Hospital.* The number is small and no conclusions should be drawn from them, but the results were so encouraging that the method seems to deserve further consideration.

In every case the serum or defibrinated blood was used within 2-3 hours after it was drawn, except in Case 4 where normal horse serum was used.

Case 1.—*Typhoid Fever.* Male, age 31, black, single, laborer. Admitted August 6, 1910.

Complaint: Headache and pain in back.

Family History: Not important.

Past History: Measles at 21; hard work as laborer; alcohol, weekly sprees.

Present Illness: Onset two weeks before admission,—headache and fever, also diarrhœa.

Physical Examination:. Well-nourished, muscular man. Tongue coated; general glandular enlargement; spleen palpable; sputum contained some blood clots. Hæmoglobin 100 per cent.

August 17: Bleeding from gums. Silver nitrate adrenalin chloride and calcium lactate without effect.

August 18: Ecchymoses appeared on conjunctiva and purpuric spots on abdomen. Hematuria. Red blood cells 2,912,000. Hæmoglobin 80 per cent.

August 19: Feces continue to contain blood; 13 cc. defibrinated human blood injected intravenously, followed by headache and restlessness.

August 20: 13 cc. defibrinated human blood, intravenously.

August 21: 17 cc. defibrinated human blood, intravenously.

August 22: 12 cc. defibrinated human blood, intravenously.

Following these injections the bleeding seemed less profuse but the blood count continued to fall and showed on the latter date, red blood cells 1,448,000. Hæmoglobin, 35 per cent.

August 23: In view of patient's desperate condition, 320 cc. of defibrinated human blood from a case of polycythemia was given intravenously. This was followed by headache, chill, extreme abdominal pain and rapid pulse.

August 24: Red blood cells 2,880,000. Hæmoglobin 40 per cent. Patient feeling much better but still slight oozing from gums and blood in his stools. 250 cc. defibrinated human blood was injected intravenously, followed by severe shaking chill with elevation of temperature and pulse.

August 26: 20 cc. defibrinated human blood intravenously.

August 27: 200 cc. defibrinated human blood intravenously.

---

* We are indebted to Drs. Halsted, Barker and Thayer for permission to report these cases.

This injection was well borne, there being no chill or elevation of temperature after it. From this date convalescence was rapid, and no further hemorrhages occurred.

September 26: Red blood cells 3,344,000. Hæmoglobin 72 per cent. Patient discharged well.

In this case two serious conditions presented themselves, one resulting from the other; persistent hemorrhage and grave anemia. Large injections of defibrinated blood were used in this case rather than small injections of serum with the hope that the fibrin ferment introduced would check the hemorrhages and that the foreign red blood cells might continue their normal function in our patient and thereby relieve his anemia. The blood counts before and after the first large injection of defibrinated blood seem to indicate that this hope was realized.

It was considered by all those who observed this case that the injections of defibrinated blood exerted a favorable influence and were perhaps the means of preventing a fatal issue.

Case 2.—*Chronic Nephritis, Myocarditis, Uremia.* Male, white, aged 43, married, lumber merchant. Admitted October 13, 1910.

Complaint: Weakness, stupor and sour stomach.

Family History: Father dead, aged 73, heart trouble; mother, four brothers and one sister, living and well. Three sisters died of tuberculosis about 25 years ago. Married seven years, no children.

Past History: Whooping cough at 14, measles and gonorrhœa at 17. At 36 a diagnosis of tuberculosis was made; patient later was pronounced cured. Malaria at 41. Patient has used alcohol and tobacco until recently, two cigars and two or three drinks daily. Has done hard physical work with much exposure all his life.

Present Illness: Onset six months ago. Started with feeling of weakness, dullness and headache. Within twenty-four hours vomiting, delirium, convulsions. After two weeks patient was well enough to return to work, and kept about his business until one week before admission to the hospital. At this time (October 4) again had headache, vomiting and convulsions. Since the first admission, six months ago, patient states that he has been subject to headache, increased urination, dyspnœa, œdema of ankles and impairment of vision.

Physical Examination: Sparely nourished man, dull, urinous odor to breath, vision impaired. Systolic murmur at apex and over body of heart, transmitted to axilla. Well marked arteriosclerosis.

October 14: Red blood cells 3,100,000. White blood cells 16,800. Hæmoglobin 50 per cent.

October 15: Five hemorrhages from bowels; prior to this date stools contained no blood.

October 16: Five hemorrhages from bowels. Following the last hemorrhage 30 cc. of fresh rabbit serum was injected subcutaneously into the thighs. Following this injection, there was no further bleeding.

October 17: Red blood cells 1,700,000.

October 20: Patient sank into a deep coma and died.

Although this patient died, it is to be noted that there was an interval of four days between the injection of serum and death, during which no hemorrhage occurred.

Case 3.—*Cirrhosis of Liver (atrophic) and Hematemesis.* Male, white, aged 52, married, banker. Admitted October 19, 1910.

Complaint: Weakness, swelling of feet, and vomiting of blood in February, 1910.

Family History: Not important.

Past History: Measles as a child, typhoid at 37, recovery Very closely confined to business, takes little exercise; cigars daily. Hearty eater. No alcohol. Constipation for two years.

Present Illness: Eight months ago, when as well as was taken suddenly with a feeling of weakness and vomiting blood, passing considerable amount of blackish material from rectum. Remained at home for one week and was in hosp three weeks. Shortly after returning to business was cons and had a fecal impaction removed by physician, after wh a time he enjoyed a feeling of perfect health. Several prior to his present hospital admission he had an attack digestion accompanied by dizziness and vomiting at inter six or eight hours. Vomitus was at first blood stained.

Physical Examination: Large fleshy man, pale, skin yellow, heart enlarged, loud systolic blow over precordium in axilla. Red blood cells 1,846,000. White blood cells Hæmoglobin 39 per cent.

November 2: Patient suffered three attacks of hematemesis was given morphine and calcium lactate.

November 3: Three attacks of hematemesis, vomiting ap mately one liter of blood. Following the last hematemesis of fresh rabbit serum was injected subcutaneously.

November 4: Gradual onset of weakness, unconsciousness death.

There was no further evidence of hemorrhage after the ministration of serum, but at autopsy the stomach was to contain a large amount of dark blood.

Case 4.—*Chronic Pancreatitis, Jaundice, Exploratory Lap omy, Drainage of Gall Bladder.* Male, white, aged 30, Admitted to hospital October 20, 1910.

Complaint: Sick stomach and jaundice.

Family History: Not important.

Past History: Generally healthy; measles in childhood.

Present Illness: Onset, according to patient, ten years ago this time he had pain in the right kidney region after any exercise and associated with this was severe pain in the right Four years prior to admission had attack of severe abdom pain, accompanied by nausea but no vomiting. These att recurred at intervals for two years; jaundice for the past year

Physical Examination: Negative except for jaundice.

October 26. Exploratory operation for obstructive jaundice Chronic pancreatitis was found, the head of the pancreas obstru ing the common duct. Drainage of gall bladder, no stones.

November 7: Eleven days after operation, patient began bleed from the wound in the abdominal wall. Hemorrhage could not be controlled by the ordinary means. 20 cc. of normal hor serum (less than one month old) was injected intravenously. lowed by chill and sharp elevation of temperature. There was no further hemorrhage, however, and patient subsequently ma a satisfactory recovery from his operation.

This is perhaps the most striking case in the series. T extremely obstinate nature of the hemorrhages in jaundi cases is well known and so alarmed were the surgeons in charge of this patient that they were unwilling that he shoul wait the two or three hours necessary for obtaining perfect fresh rabit serum.

The hemorrhage ceased after a single injection of normal horse serum and it seems justifiable perhaps to believe that the serum stood in a causative relation to this result.

Case 5.—*Typhoid Fever.* Male, white, aged 17, single. mitted to the hospital November 12, 1910.

t History: Always healthy. Seven months prior to admis-
operation for appendicitis.
sent Illness: Began six weeks before admission; headache,
and anorexia.
ysical Examination: Sparely developed and undernourished,
ie coated. Spleen palpable and soft. Rose spots present.
od culture *B. typhosus.*) Red blood cells 4,900,000. White
cells 6000. Hæmoglobin 75 per cent.
vember 16: Red blood cells 4,600,000. White blood cells
Hæmoglobin 63 per cent.
vember 23. Intestinal hemorrhages aggregating approxi-
ly 1750 cc.
vember 25: 15 cc. fresh rabbit serum intravenously. Since
there have been no further hemorrhages.

SE 6.—*Typhoid Fever.* Male, white, aged 21, single. Ad-
ed to hospital on October 4, 1910.
mplaint: Headache.
mily History: Not important.
st History: Mumps with double orchitis, measles; otitis
ral times five years ago. Gonorrhœa one year ago. Tobacco
alcohol very rarely. Works in open air, exposed to weather.
resent Illness: Onset, with drowsiness ten days before admis-
; six days before admission pain in stomach, headache, sore-
s in legs, feverish, anorexia, cough and diarrhœa.
hysical Examination: Well nourished man, tongue coated,
pable spleen, rose spots. Red blood cells 6,148,000. White
od cells 5080. Hæmoglobin 98 per cent.
ctober 11: There were four intestinal hemorrhages, aggre-
ng about 500 cc.
ctober 14: Hemorrhages continued and it is estimated that
total loss of blood amounts to approximately 2000 cc. On
date patient received 30 cc. of fresh rabbit serum, subcu-
ously.
ctober 15—6 a. m.: About 75 cc. of blood was passed from
um, but the patient's condition was much improved. 11 a. m,
c. fresh rabbit serum injected subcutaneously. 8 p. m., about
cc. of dark blood was passed from rectum. Following this
e was no further hemorrhage, but on October 19, patient
ved signs of perforation and at operation an opening was
d in the ileum through which fecal matter exuded.
tober 23: Patient died of acute broncho-pneumonia.

this case on the day following the first injection of serum
e was approximately 175 cc. dark blood passed per rectum.
possible that this was blood which had been shed into the
stine before the serum injection. The subsequent per-
tion (four days after) and death (eight days later) of the
nt does not detract from the idea that the serum in-
ons were successful in combating the hemorrhages.

he series of cases here reported is small and in several in-
ces a fatal termination ensued, but it is to be remembered
the serum injections were not given in the hope of curing
oid fever, nephritis, cirrhosis of the liver, etc., but to com-
the hemorrhage which was associated with these condi-
. If the hemorrhage was stopped by the use of serum
tions, even though the patient eventually died, our hopes
fulfilled.

our present state of knowledge, or lack of knowledge,
rning the causes of hemorrhages in these various condi-
, the treatment is necessarily empirical. The most plausi-
xplanation of any good which injections of serum or de-
duced into the circulation.

Since it is known that fibrin ferment (thrombin) readily passes over into an inactive form (meta-thrombin) on standing, it seems advisable to use serum or defibrinated blood as fresh as possible.

We have used rabit serum because it is easily obtained in a fresh condition, is but slightly, if at all, toxic for human beings, and if sensitization of the patient follows, the danger is not very great, since it is unlikely that subsequent administrations of rabbit serum would take place.

If horse serum is used one has to consider very carefully if the patient may not have been sensitized by a previous injection of antitoxin (horse serum) or may not be sensitized to a subsequent injection of antitoxin.

As to choice of methods, it seems advisable to inject directly into the circulation, although in so doing the possibility of causing intravascular clotting must be borne in mind.

If the patient has already been rendered anemic by serious hemorrhage, injection of large amounts of defibrinated blood directly into the circulation may not only check the hemorrhage but combat the anemia. With this end in view human blood should be used, since the red cells from one species cannot functionate in a different species, and it is likely that they would be quickly hemolyzed and give rise to toxic symptoms. In order to insure the best chance of success the donor should be a person from the same group (according to the isoagglutination reaction)[11] as that to which the patient belongs, thus avoiding possible danger from isoagglutination and isohemolysis.

In view of the unsatisfactory results attending the use of the ordinary methods of treating the hemorrhage in these conditions and the encouraging results from injections of serum and defibrinated blood reported here and elsewhere, we believe the later procedures are deserving of a more extensive trial.

REFERENCES.

1. Howell: The preparation and properties of thrombin, etc Am. J. Physiol., 1910, XXVI, 453.
2. Morawitz and Lossen: Ueber Hämophilie. Arch. f. klin. Med., 1908, XCIV, 110.
3. Weil: L'hémophilie, pathogénie et sérotherapie. Presse méd., 1905, XIII, 673.
4. Weil: Etude du sang chez les hémophiles. Bull. et mém. Soc. méd. d. hôp. de Paris, 1906, XXIII, 1001.
5. Weil: Recherches cliniques et physiopathologiques sur l'hémophilie d'après six cas. Tribune méd., 1906, 678.
6. Weil: L'hémostase chez les hémophiles. Rev. pract. d'obst. et de pædiat., 1907, XX, 65.
7. Weil: Des injections de sérums sanguins frais dans les états hémorragipares. Tribune méd., 1907, 21.
8. Weil and Boye: Essais de prévention et de correction de l'incoagulabilité hirudinique du sang chez le lapin. Compt. rend. Soc. de biol., 1909, 192.
9. Weil and Boye: Action des extraits d'organes sur le sang des hemophiles. Compt. rend. Soc. de biol., 1907, LXI, 454.
10. Eliçagaray: Des injections de sérums sanguins frais dans les états hémorragipares. Thèse de Paris, 1907.

11. Baum: Der Wert der Serumbehandlung bei Hämophilie auf Grund experimenteller und klinischer Untersuchungen. Mitth. a. d. Grenzgeb. der Med. u. Chir., 1909, XX, 1.
12. Trembur: Serumbehandlung bei Hämophilie. Mitt. a. d. Grenzgeb. d. Med. u. Chir., 1909, XX, 813.
13. Lommel: Ueber Blutstillung mittels Serum bei Hämophilie. Centralbl. f. inn. Med., 1908, XXIX, 677.
14. Class: Serum therapy in purpura hemorrhagica. Arch. Int. Med., 1909, VI, 170.
15. Leary: The use of fresh animal sera in hemorrhagic conditions. Bost. M. & S. J., 1908, CLIX, 73.
16. Welch: Normal human blood serum as a curative agent in hemophilia neonatorum. Am. J. Med. Sc., 1910, CXXXIX, 800.
17. Schockaert: Hémostase par le sérum sanguin. Rev. méd. de Louvain, 1910, 58.
18. Chabrol: Purpura rhumatoide avec hémorragies intestinales, traitées par des injections de sérum antidiphthérique. Bull. et mém. Soc. de méd. de Vancluse, 1910, VI, 345.
19. Bigelow: Serum treatment of hemorrhagic disease new-born. J. Am. M. Ass., 1910, LV, 400.
20. Busse: Die Behandlung von Gebärmutterblutungen rum. Centralbl. f. Gynaek., 1909, XXX,[1] 236.
21. Schwartz and Ottenberg: The hemorrhagic disease of the born, with special reference to blood coagulation and treatment. Am. J. Med. Sc., 1910, CLX, 17.
22. Mosenthal: Transfusion as a cure for melena J. Am. M. Ass., 1910, LIV, 1613.
23. Swain, Jackson and Murphy: A case of hemorrhagic in the new-born, with direct transfusion. Bost. M. 1909, CLXI, 407.
24. Lambert: Melena neonatorum with report of a case transfusion. Med. Rec., 1908, LXXIII, 885.
25. Murphy: Hemorrhage in jaundice controlled by blood fusion. Bost. M. & S. J., 1908, CLIX, 865.
26. Duke: The relation of blood-platelets to hemorrhagic J. Am. M. Ass., 1910, LV, 1185.
27. Moss: Studies on isoagglutinins and isohemolysins. Hopkins Hosp. Bull., 1910, XXI, 63.

CONCERNING THE MUCH-HOLZMANN REACTION.

By W. L. Moss, M. D.,
Associate in Medicine, Johns Hopkins University,

AND

F. M. Barnes, Jr., M. D.,
Government Hospital for the Insane, Washington, D. C.

(From the Research Laboratory, The Phipps Tuberculosis Dispensary, The Johns Hopkins Hospital.)

Based upon the investigation of a considerable series of cases Much & Holzmann[1] proposed a biological test for the diagnosis of certain forms of insanity (dementia precox and maniacal depressive insanity) which they designate as the "psycho-reaction."

The reaction consists, according to the originators, in the ability of the serum from patients suffering from the two forms of insanity mentioned, to inhibit the hemolysis of normal red blood cells by cobra-venom; the serum from patients with other forms of insanity (epilepsy with circular disturbances excepted) and from normal individuals having no such action.

The authors carried out the test on the serum of 400 individuals and state that 100 per cent of all cases in which a diagnosis of dementia precox or maniacal depressive insanity could be established with certainty, gave a positive "psycho-reaction."

Much[2] reports the results of his investigation on additional cases, confirming his previous claims and considers the reaction dependent upon a quantitative or qualitative disturbance in the cholesterin content of the serum, due to altered metabolism indicating an inherited predisposition.

Bauer[3] objects to the term "psycho-reaction," as he does not consider the reaction a specific one.

He investigated the action of the serum from umbilical cord blood in 17 cases and found, that in the presence of 14 of these, no hemolysis of red corpuscles by cobra-venom took place, while in one case, only a trace of hemolysis occurred, and in the other two cases the hemolysis was partial.

In the presence of the serum of 16 older childre adults, the hemolysis was either partial or complete in case; while in the presence of the serum of nine nursin fants no hemolysis occurred in one case, and was either or complete in the remaining eight.

Bauer thinks that the explantion of these results is sought in a paucity of activating lipoids in the serum haps lecithin) rather, than in an increase of inhibiting stances (cholesterin).

Huebner and Selter,[4] using the same technic as Much Holzmann, state the following results, which were the of experiments with 82 cases of dementia precox, maniaca pressive insanity and other types of functional and psychoses and neuroses.

1. The cobra-venom reaction was found not only in of maniacal depressive insanity and dementia precox, also in many other diseases, psychoses as well as neuroses organic brain and spinal cord diseases.

2. The reaction was positive in less than 50 per cent positively diagnosed cases of maniacal depressive insanity dementia precox.

Hirschl and Pötzl[5] found in a number of cases of the phrenic and catatonic forms of dementia precox, an resistance of the erythrocytes and an increased action of the serum against cobra-venom hemolysis. reserve their opinion as to the clinical value of the test.

Beyer and Wittneben[6] examined the blood of 345 viduals with reference to the Much-Holzmann Their results are given in the following table:

[illegible]	50%	=50%
ıcal depressive insanity	31	
psy	60	
y	74	
psychoses	19	

II.

tic diseases	25%

III.

ıal	10%

which they conclude that the reaction is of no differ- l diagnostic value. It appears to them rather as an ex- ion of certain changes in metabolism, which can occur ıe most different conditions, the exact mechanism of ı, however, is unknown.

aenkel, Kathe and Bierotte[7] carried out the reaction in ases, 58 of which were various types of psychoses, 26 patients suffering from other than mental diseases. In er cent of the psychoses a positive reaction was obtained, er cent of the patients suffering from other diseases gave sitive reaction, while of eight normal individuals tested ave a negative reaction; from which they conclude, that eaction is not specific as claimed by the originators, but differentiate between healthy and diseased individuals. consider the reaction a quantitative rather than a tative one, since they found that all sera exert some in- ing action. Differences in the resistance of the corpuscles ıdividuals were noted and in some cases, a given serum, ı tested again one set of corpuscles, gave a positive re- n and when tested against other corpuscles gave a negative ion.

difference was found between active and inactivated n. Controls were made to determine if the corpuscles hemolyzed by the serum alone in any case (isohemolysis). ıe authors consider that the Much-Holzmann reaction de- s upon the relation between activating and inhibiting ances present in the serum. These bodies probably lecithin and cholesterin.

ozieki[8] obtained the positive reaction, according to ı and Holzmann, in a number of different psychoses, as as in normal individuals and almost constantly in the of the newborn. He considers the reaction diagnosti- valueless and thinks that it depends upon the degree of ılar activity.

ıultz[9] tested the reaction in 151 cases and obtained a ve result in 50 per cent of all cases of dementia precox naniacal depressive insanity. He also obtained positive s in a number of other psychoses and in some normal ıls. A large number of his cases fell in the doubtful , due to the difficulty of making a clear reading. tz could not find that various factors such as age, sex, rature, pregnancy, general blood condition and state of ion were of any importance. The quantitative nature reaction is emphasized and he concludes that the reaction ıo diagnostic value. The relative amount of cholesterin

Geissler[10] examined 500 cases and points out that it is necessary to select the time for testing the serum according to the clinical state of the patient, as the reaction is generally negative in the intervals between attacks of maniacal depressive insanity and is more often present in those phases of dementia precox associated with periods of definite excitement or depression. Using these precautions he obtained a positive reaction in all cases of dementia precox and maniacal depressive insanity, but found positive results in other types of psychoses, as well as in non-psychic diseases. Geissler did not confirm Much and Holzmann's claims as to the positive reactions in cases of epilepsy and in those having a family history of dementia precox and maniacal depressive insanity. Eisner and Kronfeld[11] found the reaction positive in 57.8 per cent of 19 cases of dementia precox and in 50 per cent of eight cases of maniacal depressive insanity. Although they found about the same percentage of positive reactions in other psychoses and a somewhat smaller percentage of positive reactions in mentally sound individuals, they conclude that the reaction occurs with greater frequency in the psychoses as a class, than in other states. As to the diagnostic value, they cannot confirm the work of Much and Holzmann.

Plaut[12] examined 21 cases in all and found a positive test in 38 per cent of the cases of maniacal depressive insanity, and in 20 per cent of the dementia precox group. He concludes that the reaction is of no diagnostic value as proposed.

Brueckner and Much,[13] after the study of 200 more cases, conclude that although the reaction is of great theoretical serologic interest, it is not of use in the diagnosis of dementia precox and maniacal depressive insanity as originally claimed. They point out that before the reaction can be of use in psychiatry it will be necessary to determine the nature of the inhibiting substances, the factors concerned in their appearance in the blood serum, and the apparent relation existing between their higher prevalence in mental diseases than in all others examined so far. They offer no solution.

Rosanoff,[14] after the examination of 185 persons, concluded that all human sera possess some power of inhibiting the hemolytic action of cobra-venom, but that the degree of inhibition is not sufficiently raised or uniform in cases of dementia precox or maniacal depressive insanity to make the test of diagnostic value. A positive reaction was obtained in other psychoses and in normal individuals. The fact that so high a percentage of those suffering with dementia precox (57.9 per cent) gave a positive reaction, led Rosanoff to believe that a positive test might add weight to the diagnosis in certain doubtful cases, where there were other symptomatological factors leading to the conception of dementia precox. All 15 cases of maniacal depressive insanity gave negative results in Rosanoff's hands.

Pfoeringer and Landsberger[15] conclude that the cobra-venom reaction is not specific in the sense of Much and Holzmann. They consider it the expression of general changes in metabolism, especially in oxidation processes, in which the red blood corpuscles play the most important rôle; at any rate, they do not consider this idea so hypothetical as the views of those who connect the reaction with processes in the central nervous system, which have to do with changes in the lecithin and cholesterin content of the blood.

Alt,[16] without giving any of the details of the work upon which his conclusions were based, says, that in the 50 instances, in which the reaction was tried, he was unable to obtain results which would in any way permit of conclusions in agreement with those of Much and Holzmann.

Omorokow[17] found that the Much-Holzmann reaction occurred more commonly in the psychoses as a class than it did in the surgical cases and mentally normal individuals examined by him.

Nitsche, Shlimpert and Dunzelt[18] in 198 cases, of which 105 were dementia precox and 28 maniacal depressive insanity, found positive tests in 54.2 per cent of the former and 14.2 per cent of the latter. The duration of the disease, age, sex, drugs and nutritional state apparently exert no influence on the outcome of the reaction. Opposed to Geissler[10] they can find no interdependence between the results and the stage or clinical phase of the disease in question. The reaction is not considered as diagnostic of either dementia precox or maniacal depressive insanity.

Raubitschek and v. Dungern[19] in the discussion of the report by Much (*loc. cit.*) indicated that they could find no regularity in the results of the test as applied and that they found positive results in a great number of conditions other than dementia precox and maniacal depressive insanity.

Stilling[20] investigated 50 cases of dementia precox, repeating the work of Hirschl and Pötzl and found the resistance of the corpuscles to hemolysis by cobra-venom increased in only 14 cases. Twenty-two cases gave a positive Much-Holzmann reaction, when tested against corpuscles from cases of dementia precox.

The author is unable to confirm the results of either Hirschl and Pötzl or Much and Holzmann.

Bonfiglio[21] at the end of his examination of 67 cases states that the reaction of Much and Holzmann is not specific for either maniacal depressive insanity or for dementia precox. In other details, his experience has been that of almost all others, who have repeated the work. In a second communication[22] he gives a review of the literature which has appeared on this subject during the past several months.

From the foregoing summary of the literature it appears that no diagnostic significance can be attached to the Much-Holzmann reaction. Our own conclusions on this point are in accordance with those of the majority of investigators who have repeated Much and Holzmann's work. We have, however, made certain additional observations which we think justify the publication of our results.

The points which we have tried to determine may be briefly stated as follows:

1. Does the serum from cases of dementia precox and maniacal depressive insanity inhibit cobra-venom hemolysis?

2. Does a given serum always give the same reaction subjected to the Much-Holzmann test?

3. Is the result of the test influenced by the relat tween the groups (as determined by the isoagglutinati action) to which the serum and corpuscles belong?

4. Is there any difference between the action of fresh inactivated serum on cobra-venom hemolysis?

5. Do corpuscles of different groups offer different deg of resistance to hemolysis by cobra-venom?

6. Does serum favor or retard the hemolysis of huma throcytes by cobra-venom?

Technique.—In the first series of cases we followed the technique given by Much and Holzmann. The venom was obtained for us from Drs. Flexner and No of the Rockefeller Institute of New York by Dr. H. J. ley. It consisted of a 1 per cent solution in 50 per cent erine. This stock solution was kept in the ice chest and it fresh dilutions were made for each series of tests.

From the first experiments it was evident that this had much greater hemolytic strength than that used by and Holzmann, so that after a few preliminary tests it found necessary to use a 1-25000 dilution instead of a 1- dilution as recommended by the originators. Later we fur modified the technique in that we combined equal parts cc.) of cobra-venom solution, serum, and a 5 per cent susp sion of washed corpuscles, instead of 0.35 cc. serum, 0. cobra-venom solution and 0.5 cc. of a 10 per cent suspen of corpuscles. The modified technique gave better resul our hands than that proposed by Much and Holzmann.

Considerable difficulty was experienced in reading the sults of the test, as we got all grades of hemolysis from slight up to complete, no matter how we varied the pr tions of serum, corpuscles, and venom (the differences we great in tests with normal serum as in those with serum cases of dementia precox or maniacal depressive insanity that in our series a considerable number of cases fall int group giving doubtful reactions.

We made no effort to collect a large series of cases, but the other hand repeated the test a number of times with se from the same cases on different days, and frequently pu parallel series, using corpuscles from a different person in series.

We have tested the serum of 49 individuals with the lowing results:

TABLE I.

Number of Cases	Condition	Positive reactions	Negative reactions	Doubt reactio
21	Dementia precox	9	7	5
4	Maniacal depressive insanity.	2	2	0
8	General paresis	1	6	1
16	Sundry other psychoses.....	0	6	0
10	Diseases other than mental and normal	2	3	5

A number of the above cases were tested on two, three, and five occasions, but without any reference to psychic st The results for a few of these cases, chosen at random fr considerable number of cases in which repeated tests y constant for a given individual, varying sometimes from otful to positive or from doubtful to negative, but only , Case 6, from negative to positive.

TABLE II.

Case umber	Oct. 19th 1909	Oct. 27th 1909	Nov. 5th 1909	Nov. 8th 1909	Nov. 17th 1909	June 25th 1910
1	—	—	±	—	±	
2	—	—				
3	±	+	+	+	±	
4	±	±	±			
5	—				±	
6	—		+	+	±	
7	—				±	
8	+		+	+	+	
9	+	+				
10				+	+	+

performing the "psycho-reaction" Much and Holzmann nmend that the serum be tested against several different of corpuscles rather than against a single set.

has been shown[23 24] that individuals may be divided into groups according to the isoagglutinative action of the n and corpuscles. Isohemolysins have long been known xist normally in human serum and recently it has been n[24] that the serum of every individual possesses an anti-lysin which will protect not only his own corpuscles isohemolysis, but also those of any member of the p to which he belongs.

occurred to us that perhaps human serum might have such protective action as the above against cobra-venom lysis; that is, that a given serum might protect its own uscles and others belonging to the same group from lysis by cobra-venom, and that a positive Much-Holz- reaction (inhibition of hemolysis) might occur when erum tested came from a member of the same group as to which the individual belonged whose corpuscles were in the test, and that a negative reaction (hemolysis) t result, when the serum and corpuscles came from dif- t groups.

further thought that negative reactions might result in cases from the well known isohemolytic action of cer- era.

order to determine these two points we always deter- the group to which the serum belonged and also tested if it possessed an isohemolysin for any of the cor- s used, and in a considerable number of cases we set up l series of tubes so that each serum was tested against cles from several different groups. A single series will o illustrate the results.

h regard to the groups to which the serum and cor- belonged, reference to Table III shows that, except ry minor variations in degree, the hemolysis proceeds well when the corpuscles and serum belong to the roup as when they are from different groups. Further- orpuscles in the presence of their own serum are hemo- y cobra-venom to the same extent as in the presence m from another individual, provided the latter con- o isohemolysin for the corpuscles in question.

the Much-Holzmann reaction, we encountered but few sera in our series which were hemolytic for the corpuscles used, but as far as our observations go, they tend to show that if a given serum is tested against several sets of corpuscles and is found to be hemolytic for one set but not for the others, this serum may give a positive Much-Holzmann reaction when tested against the corpuscles for which it is not hemolytic and a negative reaction when tested against the corpuscles for which it is hemolytic.

TABLE III.

Showing the Relation Between the Groups to Which the Serum and Corpuscles Belong and Contrasting the Action of Active and Inactive Serum.

Venom	Serum.		Corps.	2 hours at 37° C.		22 hours in ice chest	
	No.	Gr.	Gr.	Serum active	Serum inactive	Serum active	Serum inactive
0.25cc.	20	IV	II	gK	gK	L	L
"		"	III	gK	gK	L	L
"		"	IV	gK	K	L	fvL
"	21	II	II	fvH	gK	kK	kK
"		"	III	gK	gK	kK	kK
"		"	IV	fvH	gK	kK	kK
"	22	II	II	gK	gK	L	fvL
"		"	III	gK	gK	L	fvL
"		"	IV	gK	K	fvL	fvL
"	23	IV	II	gK	gK	kK	K
"		"	III	gK	gK	kK	K
"		"	IV	fvH	gK	kK	K
"	24	IV	II	K	K	L	L
"		"	III	K	K	L	L
"		"	IV	K	K	L	L
"	25	IV	II	fvH	gK	kK	kK
"		"	III	fvH	gK	kK	kK
"		"	IV	fvH	gK	kK	kK
"	26	II	II	gK	K	fvL	fvL
"		"	III	gK	gK	fvL	fvL
"		"	IV	fvH	K	fvL	fvL
"	27	II	II	fvH	gK	fvL	kK
"		"	III	fvH	gK	fvL	kK
"		"	IV	fvH	gK	fvL	kK
"	28	IV	II	K	gK	L	fvL
"		"	III	K	gK	L	fvL
"		"	IV	K	K	L	fvL
"	29	IV	II	K	K	L	L
"		"	III	K	K	L	L
"		"	IV	K	K	L	L
"	30	IV	II	gK	gK	fvL	kK
"		"	III	gK	gK	kK	kK
"		"	IV	gK	gK	kK	kK
"	31	IV	II	gK	gK	fvL	fvL
"		"	III	gK	gK	fvL	fvL
"		"	IV	gK	gK	fvL	fvL
"	32	II	II	gK	gK	fvL	fvL
"		"	III	gK	gK	L	fvL
"		"	IV	fvH	gK	fvL	fvL
"	33	III	II	fvH	fvH	kK	kK
"		"	III	H	fvH	kK	kK
"		"	IV	fvH	fvH	kK	kK
"	34	IV	II	gK	gK	fvL	fvL
"		"	III	gK	gK	fvL	fvL
"		"	IV	gK	K	fvL	fvL

The grade of hemolysis is estimated by the color of the supernatant fluid and the amount of sediment in the tube.

H = no hemolysis.	kK = small sediment.
fvH = trace hemolysis.	fvL = almost complete solution.
gK = large sediment.	L = complete solution.
K = sediment.	

The corpuscles used in the above series were from cases Nos. 32, 33, 34.

In several series of experiments we contrasted the effect of active serum and serum inactivated at 56° C. for 30 minutes, on cobra-venom hemolysis. Table III gives one such series and shows that there was only a slight and inconstant difference between the two.

We could discover no difference in the resistance of corpuscles of different groups to hemolysis by cobra-venom and our experiments to determine if serum favored or retarded cobra-venom hemolysis gave inconstant results with different sera.

SUMMARY.

1. We concur in the prevalent conclusion that the Much-Holzmann reaction has no diagnostic significance.
2. The influence which a given serum has on cobra-venom hemolysis is fairly constant.
3. The relation between the groups to which the serum and corpuscles belong has no influence on the result of the Much-Holzmann reaction provided the serum contains no isohemolysin for the corpuscles used.
4. There is practically no difference in the effect of active and inactivated serum on cobra-venom hemolysis.
5. Corpuscles from normal individuals belonging to different groups vary in their resistance to cobra-venom hemolysis to a very slight extent.
6. The action of different sera in favoring or retarding cobra-venom hemolysis is inconstant.

LITERATURE.

1. Much & Holzmann (München. med. Wchnschr., 1909, LVI, 1001).
2. Much (München. med. Wchnschr., 1909, LVI, 2550).
3. Bauer (München. med. Wchnschr., 1909, LVI, 1367).
4. Huebner & Selter (Deutsche med. Wchnschr., 1909, 1183).
5. Hirschl & Pötzl (Wien. klin. Wchnschr., 1909, XXII,
6. Beyer & Wittneben (München. med. Wchnschr., 1909, 1464).
7. Fraenkel, Kathe & Bierotte (München. med. Wchnschr. LVI, 1461).
8. Zalozieki (München. med. Wchnschr., 1909. LVI, 1605).
9. Schultz (München. med. Wchnschr., 1909, LVI, 1528).
10. Geissler (München. med. Wchnschr., 1909, LVI, 1591).
11. Eisner & Kronfeld (München. med. Wchnschr., 1909 1527).
12. Plaut (München. med. Wchnschr., 1909, LVI, 1531).
13. Brueckner & Much (Berl. klin. Wchnschr., 1909, XLVI,
14. Rosanoff (Arch. int. med., 1909, IV, 405).
15. Pfoeringer u. Landsberger (Berl. klin. Wchnschr., 1909, 1642).
16. Alt (Psychiat. neurol. Wchnschr., 1909, XI, 103).
17. Omorokow (Ref. in München. med. Wchnschr., 1909, 2177).
18. Nitsche, Shlimpert & Dunzelt (München. med. Wchn 1909, LVI, 2101).
19. Raubitschek & v. Dungern (Ref. in München. med. Wchn 1909, LVI, 2550).
20. Stilling (München. med. Wchnschr., 1909, LVI, 2630).
21. Bonfiglio (Il Policlin. Roma, 1909, XVI, sez. prat. 1062).
22. Bonfiglio (Riv. sperim. di freniat., 1909, XXXV, 468).
23. Jan Jansky (Klinicky Sbornik, No. 2, 1907). Ref. Jahres für Neurol. & Psychiat., 1907.
24. Moss (Johns Hopkins Hosp. Bull., 1910, XXI, 228.

JUST ISSUED

THE JOHNS HOPKINS HOSPITAL REPORTS

Volume XVI (1911). 670 Pages and 151 Illustrations

I. Studies in the Experimental Production of Tuberculosis in the Genito-Urinary Organs. By GEORGE WALKER, M. D.

II. The Effect on Breeding of the Removal of the Prostate Gland or of the Vesiculæ Seminales, or of Both; together with Observations on the Condition of the Testes After Such Operations on White Rats. By GEORGE WALKER, M. D.

III. Scalping Accidents. By JOHN STAIGE DAVIS, M.

IV. Obstruction of the Inferior Vena Cava with a Repor Eighteen Cases. By J. HALL PLEASANTS, M.

V. Physiological and Pharmacological Studies on Car Tonicity in Mammals. By PERCIVAL DOR CAMERON, M. D.

PRICE IN CLOTH, $5.50. PAPER, $5.00

Orders and remittances should be addressed to THE JOHNS HOPKINS PRESS, Baltimore, Md.

The Johns Hopkins Hospital Bulletins are issued monthly. They are printed by the LORD BALTIMORE PRESS, Baltimore. Subscriptions, $1 a year (foreign postage, 50 cents), may be addressed to the publishers, THE JOHNS HOPKINS PRESS, BALTIMORE; single copies will be sent by mail for twenty-five cents each. Single copies may also be procured from the BALTIMORE NEWS CO., Baltimore.

OF

HE JOHNS HOPKINS HOSPITAL

Entered as Second-Class Matter at the Baltimore, Maryland, Postoffice.

XII.—No. 246.] BALTIMORE, AUGUST, 1911. [Price, 25 Cents

Ag
RECEIVED

CONTENTS.

PAGE

psis of Studies on Peritoneal Adhesions with a Contribu- n to the Treatment of Denuded Bowel Surfaces. (Illus- ted.)
y Edward H. Richardson, M. D. 283

Carcinoma of the Pleura. (Illustrated.)
y T. P. Sprunt, M. D. 289

of a Case of Puerperal Infection with Isolation from the rus of *B. Influenzæ* and a New Method for Making Blood r for its Cultivation.
y William Thalhimer, M. D. 293

ucocytosis of High Grade in Broncho-pneumonia in a Child.
y Charles R. Austrian, M. D. 296

PAGE

The Viability of Parasitic Ova in Two Per Cent Formalin, with Especial Reference to Ascaris Lumbricoides.
By Roger S. Morris, M. D. 299

Anterior Poliomyelitis—Note 300

The Starnook—A New Device for the Rest-Cure in the Open Air and for Outdoor Sleeping. (Illustrated.)
By S. Adolphus Knopf, M. D. 301

The Haven of Health—A Review. (Illustrated.)
By W. H. Bergtold, M. D. 303

Notes on New Books 311

Books Received 314

A SYNOPSIS OF STUDIES ON PERITONEAL ADHESIONS WITH A CONTRIBUTION TO THE TREATMENT OF DENUDED BOWEL SURFACES.

By Edward H. Richardson, M. D.,
Instructor in Gynecology, Johns Hopkins University.

scarcely necessary nowadays in a consideration of erative peritoneal adhesions to include convincing to the reality, scope and importance of this surgical . All of us know how frequently troublesome ad- occur as a mortifying post-operative complication, our best hospitals and at the hands of our most skil- geons. Impressed by several striking instances of this er which have come under my observation during the years, I was led recently to undertake a systematic f the entire available literature upon this subject, in f possible, to arrive at some definite conclusions re- the pathology, the etiology, the prevention and the nt of peritoneal adhesions. In a later publication I present a complete analytical study of this voluminous , with detailed references to the original contribu- on which I have based the opinions about to be ex-

It is my purpose in this communication simply to a brief synopsis of this work in connection with a on of a new method of treating denuded bowel

At the outset it is well to recall certain familiar characteristics of the peritoneum itself which have an important bearing upon this subject.

We are apt to forget the enormous area of this serous membrane, which has been estimated to be only slightly less than that of the skin.

Again, its remarkable absorptive power is sufficiently striking to have actuated a large number of investigators to undertake elaborate and laborious researches to determine its mechanism. As a result of this work we now know that fluids and soluble substances are, for the most part, absorbed by the blood vessels, while solid particles—such as coloring matter in suspension, bacteria, oil globules, etc.—are taken up by the lymphatics. Furthermore, that the lymphatic absorption is most active in the upper part of the abdomen, especially on the under surface of the diaphragm, and in the omentum, while in the pelvis it is sluggish—a fact now commonly taken advantage of by surgeons in the use of the Fowler's, or sitting, posture in the treatment of peritoneal infections.

It seems definitely established too that the very sensitive epithelial covering of the peritoneum is continuous, and not perforated by numerous stomata, or direct channels of communication between the peritoneal cavity and the lymphatic vessels, as was until quite recently taught. Closely allied with its absorptive power is its well-known ability to successfully cope with an astonishing amount of infection without itself being seriously or permanently damaged.

Then, too, it is important to remember that different portions of the peritoneum vary very greatly in sensitiveness to pain; in a general way the visceral portion being insensitive, while perhaps no tissue in the body exhibits quite the same exquisite sensitiveness to pain as do the parietal layers of this serous membrane.

Finally, one of its most striking characteristics is the rapidity with which it can form adhesions—a piece of gauze introduced into the abdomen during the course of an operation becoming quite snugly fixed to the visceral surfaces within a period of twenty minutes—a fact that is daily taken practical advantage of by surgeons in the disposition of protective gauzes during operations upon infected areas, and which adds materially to the sense of security afforded by gauze pads alone. This characteristic is also very intimately involved in the whole question of peritoneal drainage, and constitutes further one of nature's admirable methods of protection against peritoneal insult, as exemplified in the walling-off of an appendix abscess.

Perhaps less striking, but to my mind even more remarkable, is the completeness with which the peritoneum may absorb adhesions, and indeed completely eradicate all traces that would indicate their previous existence. From the evidence in hand it would seem to be a perfectly safe assertion to make that adhesions invariably follow laparotomy, yet how common it is nowadays to find no traces of them at a later second laparotomy!

Now obviously, all of these fundamental and important characteristics of the peritoneum, which are familiar to everyone, must be reckoned with in studying the process of adhesion formation, and in any attempt to control or prevent it. Happily we now know, as a result of much careful experimental and clinical study, quite accurately the pathological changes involved. Categorically stated, they are, in order of sequence, injury or death of the endothelium, pouring out of coagulable exudate, agglutination, organization, fibrous tissue formation, and a final termination in a contracted scar. There is a very attractive theory, supported by creditable experimental work, that the permanence or subsequent resolution of adhesions depends upon the fate of the surface endothelium. If the cells are capable of recovering from insult sustained, the process of adhesion formation advances no farther than the stage of agglutination, and later entirely disappears; but if, on the other hand, the injury has been sufficient to effect the death of the endothelium, organization proceeds and the adhesions become permanent. It seems to me, however, that further experimental confirmation is needed before we can accept this view without modification.

In view of the pathology of peritoneal adhesions jus lined, it is not surprising to find the bulk of the literatu their etiology concerned with a study of the various ag ordinarily coming in contact with the peritoneum that m be considered inimical to the vitality of its endothelium the sake of brevity and clearness we may classify the tributions according to subject-matter as follows: (1) B (2) Sutures and Ligatures; (3) Eschar of the T cautery; (4) Air; (5) Infection; (6) Mechanical, Che and other Agents.

Blood.—The final verdict has not yet been given rega the relationship of free blood in the peritoneal cavity hesion formation. After carefully and impartially we the evidence before me, however, and in the light of m observations, especially in cases of ectopic pregnancy my deliberate judgment that blood alone does not peritoneal adhesions. Although frequently associated presence of adhesions can always, in my opinion, be rationally explained in other ways than on the assump irritation from the blood.

Sutures and Ligatures.—Much of the older literatu to do with the question as to whether or not aseptic s and ligatures constitute an important factor in the pr tion of adhesions. Mass ligatures and pedicle stumps are accorded significant consideration. But while this subject of the ultimate fate of the various sutures and tures used in the tissues of the peritoneal cavity furnis study of absorbing interest, I shall have here to assume iarity with it, and dismiss the matter with the statemen where one exercises good surgical judgment and m dexterity in the choice and application of aseptic sutur ligatures, no grave fears need be entertained as to troubl adhesions arising from this source.

Eschar of the Thermo-cautery.—The results of the ex mental work on the use of the thermo-cautery in the peri cavity have been somewhat conflicting. The reason for probably to be found in a fact brought out by some later work, namely, that a superficial burning generally rise to adhesions, while a deep thorough cauterization the formation of a thick eschar, does not produce adhe The explanation offered is that the charred surface pr the granulating surface beneath from exposure until it comes covered with new endothelium. However true may be, the weight of experimental and clinical evi certainly warrants the thorough application of the ca when indicated with far less likelihood of adhesions e than if certain other procedures applicable to the same ditions are substituted.

Air.—Exposure of the viscera to the air is recogniz course, as one of the cardinal factors in the productio surgical shock. It may not be so generally known, how that much experimental work of the highest order has done to ascertain the effect of the air on the peritone dothelium, and its relation to adhesion formation. U tunately, here again the results are conflicting; but evidence is decidedly in support of the view that the air is that rapid absorption of heat and moisture from peritoneal surfaces occurs, and as a result of this drying cooling process, a necrosis of the endothelial cells is pro- ed, with resulting contraction of the blood vessels and inished nutrition, all of which stand in etiological rela- ship to adhesion formation. Thus, aside from the pre- ion of shock, we have an additional very important reason carefully protecting all parts of the peritoneum from un- exposure during the course of abdominal operations.

fection.—No one doubts, of course, that infection pro- s adhesions. But there seems to be much difference of ion as to the formation of adhesions without infection. umber of observers have called attention to the gradual ng off in the number of adhesion cases seen in the clinics esponding with the improvement in surgical technique. e have interpreted the remaining incidence, however, as lusive evidence that our methods are still imperfect as rds asepsis.

he work of the experimental investigators, while admirable ts thoroughness, has unfortunately confused rather than lified matters, by reason of the conflicting results ob- ed. No phase of this whole subject has evoked a sharper roversy than the question of infection in its relation to sion formation, and the alignment can be sharply drawn een the adherents of two views: (1) those who hold that ction is the sole cause of adhesions; (2) those who hold ction to be the chief cause, but admit that they do result various other causes acting independently or collectively. latter group are unquestionably right, as is conclusively en, not only from a comprehensive study of the whole lem of adhesion formation, but indeed is tacitly admitted heir opponents through the conspicuous absence of any it substantiation of their claims. No one, as far as I , is contending nowadays that adhesions can only be uced by infection.

chanical, Chemical and other Agents.—Under this head- re to be included nearly all of the various fluids and icals formerly so extensively used and constituting the r part of antiseptic surgical technique. All this has replaced, of course, by our modern aseptic methods, and xperimental as well as the clinical evidence testifies un- bly to a consequent diminution in the number of ad- cases seen.

undant experimental proof is available to support the ally accepted view that raw surfaces, resulting from mechanical insult to the peritoneum, are one of the onest, if not the most frequent, cause of adhesions. So, reign bodies inadvertently left in the abdominal cavity, ll as the various types of drains purposely introduced, ably provoke adhesions. In this connection too much sis cannot be given to the importance of exercising the t care and gentleness in all intraperitoneal manipula- Rough handling of the viscera; unintelligent, and I say sometimes almost brutal, use of retractors and duction of innumerable gauze pads, which, to be sure, add materially to the comfort of the operator, but more to the distress of the patient; the application of dry gauzes to the peritoneal surfaces, which generally adhere, and when removed often bring away with them the surface endothelium; unnecessary sponging, as a sort of surgical tic or habit spasm; careless application of hæmostats, with painful indifference to the mass of crushed tissue left to necrose in the grip of the ligature—all of these constitute transgressions of which few of us can claim innocence. But they also constitute a prolific source of adhesions, and should therefore be constantly borne in mind in order to impress upon us the value and importance of diligently cultivating a healthy aversion to unnecessary trauma, and a profound respect for the tissues.

Coming now to a consideration of the prevention and treatment of adhesions certain prophylactic measures at once suggest themselves as being clearly indicated from what has already been said. Briefly stated these are—rigid asepsis; avoidance of mechanical, chemical or thermic trauma; careful covering up of all raw surfaces; use of hot moist gauze; and avoiding exposure of the peritoneum to the air. Thus far, practically everyone is agreed. But the common experience that troublesome and dangerous adhesions still quite frequently occur, in spite of the strictest possible observance of these measures, has stimulated investigators to undertake the most varied and elaborate researches with the hope of discovering some prophylactic or remedial agent that would prove efficacious in all cases. This work has resulted in the production of many ingenious and valuable procedures, all of which have at one time or another been enthusiastically advocated, and have received varying degrees of support from the profession generally. Most of them have been sufficiently tested now to admit of a pretty accurate opinion being formulated empirically, as to their actual worth. From a study of the numerous reports the following classification and valuation of these heterogeneous devices seems warranted.

1. *Non-Absorbable Protective Membranes.*—Under this caption may be included the covering of raw surfaces with collodion film; gelatin-formalin coagulum; lymph-aristol coagulum; silver foil; solution of gutta-percha in chloroform, carbon bisulphid, or xylol; and thin sheets of silk or rubber fabric.

None of these agencies can be relied upon to furnish more than a small percentage of uniform and successful results, and on this account, cannot be recommended for general use.

2. *Manual and Postural Arrangement of the Viscera.*—This is accomplished partly through proper disposal of the viscera with reference to normal anatomical relationship at the end of the operation, and partly through post-operative posture in the ward, with the double idea of avoiding permanent kinks at those movable parts of the gastro-intestinal canal which commonly produce untoward symptoms—such as the pylorus, upper part of jejunum, lower ileum, cæcum, transverse colon, and sigmoid—and for the further purpose of gravitating the abdominal contents away from raw surfaces. Both of these

procedures seem rational and worthy of more general consideration and use.

3. *Peristalsis.*—Considerable work has been done on the post-operative use of physostigmin, with the idea of stimulating strong peristalsis, and thus liberating early adhesions and preventing their recurrence. Conflicting results have been reported, however, and the routine use of this drug is of doubtful value.

4. *Specific Drugs.*—Iodides have been recommended with the idea that they inhibit proliferation of connective tissue, and aid in its absorption. Thiosinamin, and its combination wth salicylate of sodium, known as fibrolysin, have been accredited with possessing a softening influence upon cicatrices and other abnormal growths of connective tissue.

The use of various anti-fibrin ferments, with the intention of preventing coagulation of exuded serum—the first essential stage in adhesion formation—have been also tested experimentally and recommended. An encouraging increase of success has attended this pioneer work in an effort to apply specific chemo-therapy to the problem of peritoneal adhesions, and further development along this line is to be confidently expected.

5. *Normal salt solution* in large quantity poured into the abdomen at the end of the operation in order to float the loops of bowel into their normal relationship and keep denuded surfaces separated, was at one time extensively used. Later on adrenalin was added, with the idea of preventing exudate through its constricting action on the vessels. But it has been shown that absorption is too rapid to admit of much new growth of endothelium over raw surfaces before they again come into contact with adjacent tissues.

6. *Gases.*—Distention of the abdomen with oxygen gas just prior to closure of the peritoneum has been recently suggested as a useful resuscitating and anti-adhesion measure. So, too, intra-abdominal hyperæmia, brought about by periodic local application of the hot-air bath to the lower trunk has been recently quite warmly advocated.

7. *Eschar of the Thermo-cautery.*—As already indicated, if this measure is utilized, the cauterization should be very thorough, so as to form a deep and lasting charring of the tissues. This measure undoubtedly possesses distinct advantages under certain conditions.

8. *Lubricants.*—Because of their harmlessness, ease of application, and apparent effectiveness in many cases, various oily and fatty substances are perhaps more extensively used than any other single artificial measure in the treatment of adhesions. A number of substances of this kind have been suggested from time to time and carefully studied experimentally; including olive oil, vaseline oil, liquid lanolin, liquid petrolatum, and others. Vaseline oil seems to possess certain advantages, notably the fact that irritating fatty acids are not so readily split off from it during the process of sterilization, as is the case with olive oil. The sterilization should be carefully done, and the temperature not carried too high for this reason.

9. *Non-Viable Animal Membranes.*—Cargyle membrane, made from the peritoneum of the ox; a similar memb from the shark's peritoneum; goldbeaters' skin, derived fr the outer coat of the cæcum of the ox; and a fine woven made of catgut, constitute the members of this gr Cargyle membrane has been more extensively used than of these, but in the hands of some investigators it has g miserable results, and even its most enthusiastic advoca admit its failure in a number of instances. Theoretical is surprising that these membranes do not uniformly pro rather than prevent adhesions—and there is considerable perimental evidence in support of this view—inasmuch a piece of dead animal tissue that has been kept in preserv fluids, although it may later undergo absorption, is in ev sense of the word, a true foreign body while it remains in peritoneal cavity, and must be so regarded in its relation adhesion formation. It seems to me inevitable, therefo that these substances will gradually fall into disuse.

10. *Viable Grafts.*—Much more rational are the efforts cover raw surfaces by plastic operations on the periton or by autogenous grafts of omentum. It has been sho experimentally that if the entire omentum of dogs be am tated and simply dropped into the peritoneal cavity, it d not undergo necrosis, but on the contrary, quickly bec spread out over the parietal peritoneum, to which it adh and promptly becomes vascularized.

Furthermore, it has been shown that omental grafts app to denuded bowel surface establish sufficient vascular co munication to admit of injection from the aorta with an fluids within the surprisingly short period of twenty-fo hours. Again, no one has reported, as far as I know, an stance of necrosis of an omental graft. But unfortuna they do not prevent adhesions, except when applied to abdominal parietes and to organs possessing strong peristals such as the stomach and urinary bladder. On the small bo they are very useful in reinforcing weak points and sut lines, but here they invariably adhere to neighboring loops.

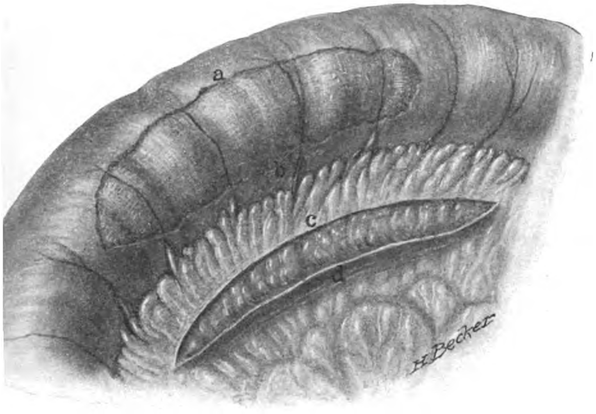
It is evident, therefore, that grafts of fresh omentum an peritoneum have a very important and wide field of applic tion, and it seems quite feasible to have at hand in the opera ing room, just prior to operations upon bad adhesion ca an abundant supply of peritoneum obtained from a fres slaughtered calf, under aseptic conditions, and carefu guarded from mechanical or chemical trauma, for extens application.

A New Method of Treating Raw Bowel Surfaces

A few months ago during the course of an operation fo the relief of an enormous post-operative ventral hernia situation arose which suggested to me a new, and what I believe to be an eminently satisfactory method of dealing wi denuded bowel surface under certain conditions. The patie was a very large, fat woman, well past middle life, who, b reason of circulatory and renal disease, was rather a poo surgical risk. Moreover, about six months previously she had undergone a very serious operation for radical removal of generative organs on account of a moderately advanced can

and broken down with a re-
ting hernia. Occupying the hernial sac, besides a bulky entum densely adherent throughout, there was a long loop ileum, coiled in a horse-shoe fashion, each limb of which l become so intimately adherent to the peritoneal lining the sac as to render separation along any definite line of ıvage impossible. The two limbs were also adherent to h other by several transverse bands of dense fibrous tissue. :er effecting the release of the intestine I had, therefore, › extensive raw areas, each measuring two to three inches length, involving nearly one-half the circumference of the rel, and separated from each other by six or eight inches of ctically normal intestine.

ınother factor of great surgical importance was the ex- sive dissection necessary to cure the hernia, by reason of wide separation of the recti muscles, the enormous size of opening, the abundant scar tissue produced by the old



G. 1.—An extensive denuded area on the surface of the ileum ere shown. Observe that at its widest portion *a-b* it involves ly one-half of the circumference of the bowel. The liberal sit of fat in the mesentery here represented admits of the y separation of its two peritoneal leaves. Note that the in- n for this purpose through the upper leaf is made about 1 cm. its bowel attachment, in order to avoid the numerous branch- vessels in this region. The separation of the flap *d* is now y and safely effected to any desired extent, since the average ı of the mesentery is eight inches. A flat, blunt instrument— atula, for example—is best suited for this step. The rich ılar anastomosis between the mesenteric leaves, afforded by uperimposed colonnade arrangement of the trunk vessels, is 7 seen.

tion, and the atrophy and impaired vascularity of the es to be utilized in effecting the closure. These unfortu- circumstances, together with the patient's general con- ı, made it highly important that all possibility of wound tion should be scrupulously avoided, as well as that every ɔle precaution should be taken against the occurrence of :inal obstruction, which might necessitate the undoing of y work. Now, recalling the condition of the bowel sur- just described, it is evident, upon consideration, that of the customary methods of dealing with this complica- rere applicable to the conditions in hand. I could not, for proximity to each other—obstruction would almost certainly have ensued. The various other measures already described were either impracticable or too unreliable, in view of the serious consequences of failure. I did not dare resort to lateral anastomosis, because I was dealing with the lower ileum; and while this procedure would have taken care of the raw surfaces and obviated the danger of obstruction, it would at the same time have afforded an excellent opportunity for infection of the devitalized tissues of the wound, with complete destruction of all my plastic work, and immediate recurrence of the hernia. Fortunately, the problem was practically solved for me by the accidental laceration and partial retraction of one leaflet of the mesenteric peritoneum just along its line of attachment to the bowel and adjacent to one of the raw areas on the surface of the latter, which occurred during its separation from the hernial sac (Fig. 1). There being a considerable deposit of fat between the two layers of mesenteric peritoneum, it was a surprisingly simple and easy procedure to extend the separation of the torn leaflet and its attached fat in all directions from the underlying vessels and the opposite intact leaflet with its fat, thus obtaining a large movable flap of normal peritoneum which was easily drawn up without tension, spread out over the raw surface on the bowel, and tacked down with a few fine silk sutures (Fig. 2). The result was eminently satisfactory in every way, this very simple device, which was quickly carried out, having sufficed to abolish a rather complex and embarrassing surgical situation. The patient's recovery was complete and she is now comfortable and happy.

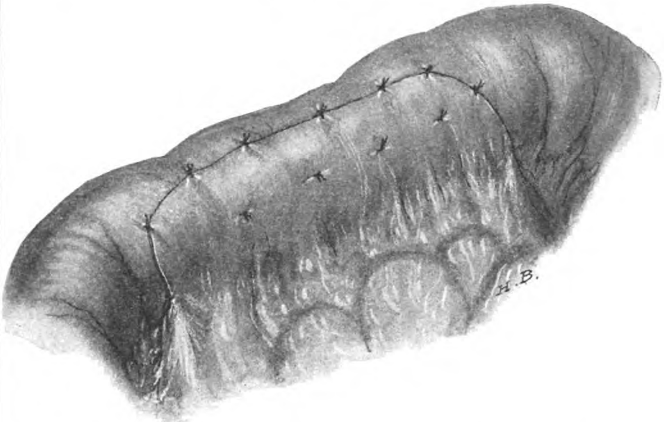


FIG. 2.—The detached flap of peritoneum is here shown drawn up over the raw bowel surface and firmly fixed by interrupted sutures of fine silk. Note how completely and satisfactorily the defect has been remedied. Observe too, that, owing to the mobility of both the bowel and its mesentery, the mechanical effect on the bowel lumen and the mesenteric circulation is negligible, and cannot produce any serious consequences. Care must be taken to close the angles of the mesenteric flap just at the bowel margin, as shown, to avoid the possibility of an intra-mesenteric hernia.

This fortunate experience led me to investigate the idea further in order to determine accurately its limitations and to meet certain theoretical objections.

Thus it was desirable to ascertain if the method could be applied to all portions of the intestinal tract; if the separation of the two peritoneal leaves of the mesentery could be rapidly effected, without injury to the vessels in poorly nourished individuals whose mesentery usually contains very little fat; and if not, to consider the feasibility of lifting a fold of both leaves of the mesentery, without incising either, over the raw surfaces, thus effecting practically a plication of the mesentery—a modification of the method that would make it applicable to these cases also (Fig. 4); to determine further what effect this axial rotation, or partial envelopment of the bowel within its own mesentery, would have on the caliber and direction of the lumen, with reference to obstruction; to investigate to what extent it would be practicable to so treat the bowel, and to ascertain particularly what effect was produced on the mesenteric and bowel circulation by this mechanical alteration of normal conditions; and finally, how much tension the leaflet of mesenteric peritoneum is capable of withstanding, with reference to its being torn loose by post-operative distention or vigorous peristalsis.

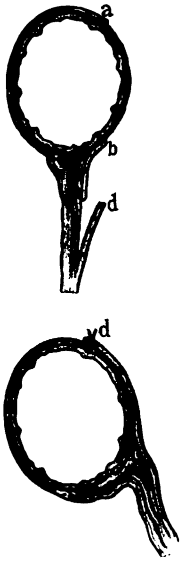


FIG. 3.—The bowel and its mesentery are here represented in cross-section. In the upper drawing, the area between *a* and *b* is the raw surface; *c* marks the point of incision through one peritoneal leaf of the mesentery; and *d* the flap to be freed and drawn up. The lower drawing shows the flap *d* closely applied over the denuded area, and fixed by sutures which should penetrate the submucosa.

The fresh cadaver seemed to offer the best method of settling these questions, and my conclusions, based upon such a study, are as follows:

1. The procedure is best applicable to that portion of the intestinal tract where, in such cases as the one described, present methods are inadequate, namely, from the upper jejunum to the lower ileum. It may be rationally applied, however, to any portion of the bowel possessing a mesentery of sufficient length to admit of its ready execution.

2. Care must be exercised at the duodenum, upper jejunum and lower ileum not to produce kinks of the bowel.

3. In cases exhibiting a scanty deposit of fat in the mesentery, plication is a rapid, safe and efficient substitute for separation of the two peritoneal leaves.

4. Aside from a slight spiral rotation, which in view of peristalsis and the mobility of the parts is entirely insufficient to produce obstruction, the procedure has no demonstrable effect on the bowel lumen.

5. It can be safely extended to include nearly one-half the circumference of the bowel and three to four inches of continuity. There is no apparent reason why it should not be repeated as often as necessary at different levels of the intestinal tract.

6. In view of the rich vascular anastomosis and the mobility of both the bowel and its mesentery, if care be exercised in placing the sutures so as to avoid the trunk vessels, the effect upon the circulation is negligible.

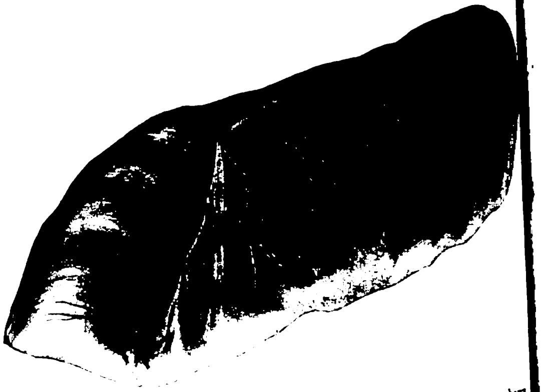


FIG. 4.—The plication modification of the method is here shown. Owing to an almost total absence of fat between the peritoneal leaves of the mesentery in some cases, it is unsafe and impracticable to attempt their separation. In such cases *neither leaf is incised, or separated from its bowel attachment*, but both leaves are grasped together at the proper distance from the bowel border, lifted over the raw surface and fixed by silk sutures. It amounts to a plication of the mesentery, or a partial envelopment of the bowel within both layers of its mesentery. Note that care has been taken to place the sutures between the vascular trunks. This simple modification renders the method applicable to all cases, is even more quickly executed, and is eminently safe and satisfactory.

7. Stability and permanence of the coaptation is readily secured through intelligent disposition of the sutures.

SUMMARY.

Certain anatomical and physiological characteristics of the peritoneum have an important bearing on the problem of peritoneal adhesions. Notably its area, its absorptive power, the variable sensitiveness to pain of different portions, the continuity of its epithelial surface, the rapidity with which it can form adhesions, and the completeness with which it can later absorb them.

which terminates in dense adhesions with scar tissue mation.

Etiologically there are a number and variety of factors inlved, but they can all be grouped under the two heads, *psis* and *Trauma.*

As prophylactic and curative measures, emphasis should given to rigid asepsis, the use of moist hot gauze, careful vering of all raw surfaces, avoiding unnecessary exposure, stricting trauma and spreading out of the omentum over visceral surfaces before closing the abdomen.

A number of additional safeguards are available which have ions. the most valuable of these for general use are lubricants, viable grafts of peritoneum, or omentum and judicious ante- and post-operative therapy.

The field of specific chemo-therapy offers the brightest hopes for future progress.

In properly selected cases the use of adjacent mesentery for covering raw bowel surfaces possesses distinct advantages over all methods hitherto proposed.

I desire to express my thanks to the pathological department of The Johns Hopkins Hospital for giving me the opportunity of testing, on the fresh cadaver, the method above described.

PRIMARY CARCINOMA OF THE PLEURA.

By T. P. Sprunt, M. D.,

Instructor in Pathology, The Johns Hopkins University.

The primary malignant tumors of the pleura, although rare, ve considerable interest for the clinician on account of the ficulty encountered in attempting an accurate differential gnosis. They have their principal interest, however, from point of view of their pathology; and not only does this erest attach to the question of histogenesis but to their ultite nature and origin. Doubts have been expressed as to ether we are dealing here with a true tumor in the narrower se of that term or whether the lesion may not be the result the chronic inflammatory process which so uniformly acnpanies it.

The classical pleural tumor was first described by Wagner l later by his pupil Schulz, and called by them endothelial cer. The pleura was much thickened and somewhat roughd, resembling the appearance seen in the mucosa of the dder with prominent, hypertrophic musculature. Histoically the growth in the thickened pleural tissues consisted numerous alveolar and tubular structures separated from other by a connective tissue stroma and filled with large helial-like cells. They considered the endothelium of the ph vessels the point of origin of the growth.

number of cases have since been reported. Glockner, in 7, collected 42 cases from the literature and added 7 of his . Gutmann, in 1903, found 9 additional cases. In 1905 h collected 47 endotheliomata and 16 sarcomata.

he individual authors, as a rule, compare their cases with classical Wagnerian tumor which most of them closely mble. The tubules and alveoli are sometimes filled with , at other times the spaces are lined by cubical or cylindriells in one or many layers. Practically all agree that the strongly resemble epithelial cells and that the histologipicture is that of carcinoma, but the great diversity of ion as to the nature of the affection may be easily appred after a mere enumeration of the names, which have given it. Among these designations we may mention that dothelial cancer (Schulz, Wagner, *et al.*), lymphangitis prolifera (Fraenkel, Schweninger), lymphangitis carcinomatodes (Neelsen), sarcocarcinoma (Boehme), alveolar endothelial sarcoma (Padock), endothelioma (Eppinger and many others), carcinoma (Lepine, Pitt, Benda, Dreesen, Ribbert, Orth).

In most of these reports the lining membrane of the pleura was either entirely lost or its cells, if present, only slightly changed. The great majority of the authors refer the point of origin of the tumors to the endothelial lining of the lymphatics.

Benda reports a case in which the principal growth occurred on the pleural surface which was covered with numerous villi. The picture reminded him of the formation of papilli in certain ovarian cystomata. These villi were covered by cylindrical cells and possessed a stroma of connective tissue and blood vessels or occasionally granulation tissue. In the depth, there were many alveoli and strands of epithelial cells or else glandular formations and even small cysts which occasionally showed papillomatous projections from their walls. He considers as true epithelium the cells covering the pleura and his tumor, therefore, as a true carcinoma. He could come to no decided opinion as to the participation of the lymph vessel endothelium, but was inclined to regard the tumor masses in the subpleural tissues as extensions downward from the growth on the pleural surface.

Dreesen reports a similar case and reaches similar conclusions. They are both of the opinion that many of the reported cases had a like origin.

In connection with tumors of the serous surfaces there has been much discussion concerning the embryological development of the serous lining membranes, and concerning the classification of their cells. In the older literature the term endothelium is used almost exclusively, but in recent years many authors consider these cells more closely allied to epithelial structures than to the endothelium and consequently prefer to speak of them as epithelium. Malignant tumors arising from these cells therefore, they say, should be called carcinomata.

It is now generally held that in their embryology these cells have nothing in common with the endothelial lining cells of the blood and lymph vascular systems. In addition, it has been shown that in certain of the lower vertebrates, the body cavity originates as an invagination of the hypoblast, but there is no sign of such an invagination in the higher vertebrates, in which the body cavities seem to originate by a splitting of the mesoblast with subsequently a differentiation of some of its cells into a lining membrane.

From studies of their behavior under pathological conditions, Mönckeberg, Büttner, Hinsberg, Herxheimer, v. Brunn, and others conclude that the lining cells of the body cavities have more in common with epithelium than with endothelium and the connective tissues. Opposite opinions are expressed by Ranvier, Roloff, and others who conducted somewhat similar experiments. Beitzke, Orth, and Ribbert among other eminent pathologists speak for their epithelial nature.

If then we choose to speak of these cells as epithelium we must regard them as epithelial cells of mesoblastic origin, and related in this respect to the epithelium of the adrenals, kidneys and other organs of the urogenital tract including perhaps that of the uterus and vagina. Most classifications of tumors leave those arising from these organs in a sad state of disorder and it is especially in tumors of this type that Adami's classification seems superior.

In a recent article on pleural tumors Ribbert gives his opinion that the so-called endotheliomata of the pleura are not derived from the endothelium of the lymph vessels, but either from the surface epithelial cells or from misplaced epithelium, and that they should be termed carcinomata. However, he says that such an origin has not yet been proved beyond doubt in a single case, since sufficiently early stages have not been observed.

The tumor described in this report can hardly be regarded in any other way than having arisen from the epithelial lining of the pleura. Its histology in no way resembles that of the classical "endothelial cancer," and it has many points of departure from those described by Benda and Dreesen.

Clinical History.—Mrs. ——, a white woman, was a private patient of Dr. Thomas R. Brown, to whom the author is indebted for the clinical notes.

She was admitted to the Church Home and Infirmary, March 22, 1910, about two and a half weeks after the onset of her terminal illness, with extreme pain in the left chest and abdomen, some nausea and vomiting, and persistent cough.

Of interest in the *family history* is the fact that her mother died of carcinoma of the uterus.

In the past the patient had been strong and well physically, but, married to a confirmed drunkard, she had been subject to great nervous strain and at times was the victim of physical violence. A few years before the onset of the present illness a laparotomy had been performed by Dr. H. A. Kelly and the appendix, right tube and ovary removed. Examination of the specimens showed a chronic inflammatory process, but no evidence of neoplasm.

When she entered the hospital the physical signs were typical of a pleural effusion on the left side. The heart was over to the right parasternal line. The point of maximal pulse was difficult to determine, but there was a distinct pulse half way between the parasternal and sidesternal lin the left side. The whole of the left chest showed absolute ness and loss of vocal fremitus. The breath sounds were over this area except in the upper left front, where they were tant, harsh and of broncho-vesicular type.

The spleen was palpable. The liver, also, was readily felt perfectly smooth and not tender on pressure.

No tubercle bacilli could be found in the sputum. The stools and stomach contents were normal. Rectal examina revealed nothing abnormal. The blood count showed leucocytes and 3,500,000 red blood cells.

The left thorax was tapped 14 times and an average of a over 2000 cc. of fluid aspirated each time. In all 28,270 cc. removed: the largest amount aspirated at any one time 3150 cc. The fluid was always gelatinous, varied in color pinkish-straw to cherry red, and occasionally contained bits of fibrin. There was between 1 per cent and 2 per red blood cells and many leucocytes with a great preponder of neutrophiles. No cells nor fragments suggesting a growth were observed. Cultures from the fluid remained and stained smears showed no organisms. Inoculation guinea pig also proved negative.

The relief after each tapping was slight and lasted only a while. On each occasion there was a remarkable shifting heart's position from 4 to 6 cm. without any change in the rate.

During the first month in the hospital, the temperature pulse curves were about normal. The temperature during last 3 weeks was intermittent, from 97° F. to 102° F. or 104° F the pulse varied from 100 to 130. The pain in the chest dyspnœa were often very distressing and there occurred tervals marked abdominal symptoms, as nausea, vomiting pain. Cough was never a prominent feature and there was sputum. On one occasion shortly after tapping a small of bright red blood was expectorated.

The subjective symptoms increased in severity and less less relief was experienced after the tappings which occurred more frequent intervals. The patient died apparently asthenia *ten weeks* after the appearance of the first symptoms

The physical signs of extreme pleural effusion, the orrhagic character of the exudate, the lack of relief after piration, the rapid reaccumulation of the fluid, the bacteriological tests and the progressive cachexia led clinical diagnosis of malignant growth of the left Whether the growth was primary or secondary could determined.

The autopsy (J. H. U. Path. Lab., 3386) was per two hours after death.

Anatomical Diagnosis.—Primary carcinoma of left extension to left lung and bronchial lymph nodes; ous pleuritis (left); total atelectasis of left lung; hydrop dium; right hydrothorax; hypostatic œdema and conges of right lung with some atelectasis of lower lobe; of uterine plexus; pulmonary emboli; chronic passive tion of spleen; fatty degeneration of heart muscle and anemia; cachexia; scar of old laparotomy (right oöphorectomy and appendectomy); chronic pelvic with adhesions to sigmoid and ileum; dilatation of and duodenum.

. The mucous membrances and finger nails are decidedly The muscles are flabby. There are no glandular enlarge- :s in the neck, axillæ or inguinal regions. The breasts are netrical, are not pendulous, there is no great excess of fat, ımps, or any demonstrable abnormality. There is a linear an scar in the lower part of the abdomen. The fat of the minal wall is about 1 cm. in thickness and has an orange . The peritoneal surfaces are normal; there is no free . The stomach and duodenum are greatly dilated. The extends about 5 cm. below the costal margin in the right millary line and to a point about 4 cm. above the umbilicus ie median line. The diaphragm on the left side has been ed down until its abdominal surface is convex instead of ing the usual dome-like concavity. On the right the dia- gm reaches the fifth rib. Its peritoneal surfaces are smooth oth sides. The mesenteric lymph nodes are not enlarged. it two feet above the ileocæcal valve a loop of the ileum ends into the pelvis and is adherent to the posterior wall of iterus. A loop of the sigmoid flexure is also adherent to an mmatory mass around the left ovary.

orax: On removing the sternum there is a gush of turbid, v-colored fluid from the left pleural cavity which is filled this material. The right pleura contains about one litre of tly cloudy fluid. The pericardium also shows a considerable s of fluid. Its surfaces are smooth, although the parietal seems somewhat thickened.

e heart, which was displaced to the right, weighs 250 grams. e is a slight excess of lemon-colored, subepicardial fat, and angential section the muscle is slightly mottled with yel- sh specks.

ngs: The right lung is entirely free from adhesions. Its ıces are smooth and glistening. The upper and middle lobes slightly moist and show a moderate grade of compensatory ıysema. The tissues of the lower lobe are distinctly more t and more congested and show in addition partial atelec- . The small arteries contain reddish, friable thrombi which ude from the lumen on the cut surface.

e left pleural cavity is filled with several litres of cloudy in which float strands and filmy sheets of a very friable rial. This substance lines the whole pleural cavity in veil- layers, is quite soft, of a pinkish-gray color and can be scraped off with the fingers. When this is removed from arietal wall a harder tissue is revealed which is roughened ıall, thickly set nodules about the size of a pea and smaller. appearance is especially striking on the parietal pleura ite the third, fourth, fifth and sixth ribs.

lung is reduced to a fusiform swelling along the left side mediastinal tissues and projecting only about 3 cm. into eural cavity. It is covered by the friable shreddy material y described. On incision of the lung there is found im- tely beneath the fibrinous exudate a thin, apparently fibrous Beneath this the lung substance is green in color, com- collapsed and airless with small black specks scattered hout. Here and there appear elevated nodules of a bluish- tissue. These nodules are about 1 cm. in diameter, but nally fuse into larger areas measuring 2½ cm. All of are superficial and near the pleural surface. They are with numerous, yellow and black specks. The left side of phragm shows also the upper surface of fibrinous material, of white tissue measuring about 2 or 3 cm. in thickness, h which is a very pale muscle layer 5 mm. thick and show- re and there white streaks. The costal pleura is easily d off in some places, but in others is quite firmly bound thoracic wall. Section through the nodular area already ied shows that some of these nodules are 1 cm. in thick-

opaque, yellow and yellowish-white flecks. The bronchial and peritracheal lymph nodes are enlarged and black. The surface of a few of those nearest the diseased pleura is covered by a rather thick bluish-white layer which extends down into the lymphatic tissue. The trachea and bronchi are somewhat congested, but are otherwise normal.

The axillary lymph nodes on the left side are not enlarged nor of increased consistence. Incision through the breast tissue shows nothing abnormal.

The œsophagus and aorta are normal.

The spleen is enlarged, weighing 250 grams. The surface is dark purplish-gray in color. The organ is very firm with a dark purple, smooth, cut surface.

The stomach and duodenum are considerably dilated and their mucosa digested, but otherwise the gastro-intestinal canal shows nothing remarkable.

The liver weighs 1400 grams, measuring 26 x 19 x 10 cm. Multiple sections show nothing unusual.

The pancreas, adrenals and kidneys are practically normal, although somewhat pale.

Pelvic Organs: The rectum is normal. The left uterine appendages are bound together and to the posterior wall of Douglass' pouch by old fibrous adhesions. The right appendages and appendix had been removed at operation. All the radicles of the venous plexus on each side of the cervix uteri contain cylindrical, reddish, friable casts. The retroperitoneal lymph nodes are somewhat enlarged, pink in color and slightly increased in consistence.

The neck organs and brain were not examined.

Microscopical Notes.—Sections through the nodular portion of the costal pleura show the subpleural tissues thickened and infiltrated with small round cells (Figs. 1-4). The nodules described in gross show the histological appearance typical of carcinoma. There are very rarely any tumor cells in the subpleural tissues, but toward the pleural cavity there extend up numerous finger-like projections having a stroma like that of the sub-pleural tissues and covered by a single layer of columnar epithelium. These processes anastomose quite freely, and in this way form spaces of various sizes and shapes which are lined by one or more layers of columnar cells. Between the nodules the pleural membrane is preserved in many places. The cells show various stages of proliferation. For the most part the cells are columnar in shape, and there are frequent small villi covering the pleural surface (Figs. 3-4). Occasionally the pleural lining is straight and regular consisting of cubical cells (Figs. 1-2), or even flat cells having much the appearance of the normal lining cell (Fig. 6). The transitions may be traced from this regular arrangement to the complicated papillomatous nodules already described. Not only is the pleural surface covered with many villous projections, but these occur regularly in the cyst-like spaces of the larger tumor nodules giving the picture of an intracystic papilloma (Figs. 1, 3, 4, 5).

Near the base of these nodules this cystic and papillomatous structure is most marked. The cells are of a high columnar type with large vesicular nuclei (Fig. 6). Usually there is a single layer, but at times they are piled up several cells thick. In the more superficial parts of the tumor, the papillomatous projections are less marked, and the spaces are being filled up by proliferation of the epithelial cells (Fig. 7), so that here and there they appear as solid strands of epithelial cells, separated by narrow bands of stroma giving the typical appearance of carcinoma simplex (Fig. 8). The free surface of the tumor is covered by a thick layer of fibrin and leucocytes with many red blood cells. Below this there is a very cellular granulation tissue which forms the stroma for the more superficial parts of the tumor. Occasionally the tumor is seen beneath the former line of the pleura in the subpleural tissue. Here it takes the form of a small cyst-like structure with papillomatous projections into its cavity (Fig. 4). These are lined with quite regular high, columnar epithelium. Similar structures are found occasionally in the fibrous layer over the diaphragm. The muscle of the diaphragm is infiltrated with the elements of the acute inflammation, is quite œdematous, but shows no infiltration by the tumor.

Sections through the lung and visceral pleura show on its surface an acute inflammatory exudate and beneath this a thick layer of granulation tissue (Fig. 9). There is no sign of the original pleural lining. Along the superficial surface of the lung there are masses of the tumor quite similar to the areas already described, appearing as larger or smaller cystic structures with papillomatous lining (Fig. 11). Many of the larger ones show granular necrotic contents. The tumor cells like those on the costal pleura are cylindrical with vesicular nuclei and fairly regular appearance, although here and there several layers are seen and an occasional dark, irregular nucleus. Dipping down into the atelectatic lung there are larger tumor nodules which have a somewhat different appearance. These have much the same general arrangement with thin, anastomosing strands of stroma lined by columnar cells of irregular shape and size, giving a much more malignant appearance (Figs. 9, 11, 12). There is no sharply defined line between these tumor masses and the lung tissue, but little tongues of the tumor extend in between the tissues of the collapsed lung in a definitely invasive manner (Fig. 12.) The bronchi within the lung seem quite regular and normal.

In other sections of the visceral pleura and lung, instead of the large areas along the former pleural line there are small spaces from 15 to 30 microns in diameter lined by similar cylindrical or cubical cells (Fig. 9, 10). In these sections the portion of the tumor invading the lung resembles those already described.

Left bronchial gland: The metastasis here is quite similar to those in the lungs—the cells, however, are not quite so irregular in appearance, and there is more of a tendency in proliferating to fill up the alveolar space, forming solid strands of epithelial cells. The basement membranes of the gland-like structures are very indefinite (Fig. 13).

Other lymph nodes, mesenteric, axillary, retroperitoneal and higher peritracheal nodes show no metastases.

Mitotic figures are rarely seen in the more typical papillomatous areas at the base of the parietal nodules and on the surface of the lung. They are readily found in the more superficial portions of the nodules and are quite numerous in the extensions into the lung tissue.

In summary we have a large number of nodules on the parietal pleura consisting of a papillomatous growth with cylindrical cells covering the connective tissue strands. At the edge of such nodules we find villi projecting from the pleural surface forming a transitional stage between the more conspicuous growth and the flat pleural surface. Selective stains show the usual layer of elastic tissue beneath the pleura, although the fibers are much stretched and quite atrophic. This gives additional evidence, if any is needed, that the membrane in question is really the serous covering of the pleura. Just below the line of the pleura there occur occasionally small, cyst-like structures resembling the basal portion of the surface nodules. These are found in other parts of the parietal pleura, which do not show the lining membrane, and along the surface of the lung. In close association with these regular, adenomatous areas begin the extensions into the lung substan [illegible] which have a less typical histological appearance (adeno-carcinoma) and show definitely invasive growth i deeper portions.

The objection may be raised that such a picture mig afforded by the extension of a bronchial cancer to the pl This view has been given careful attention. All the evi is in favor of a primary pleural tumor extending into the There is none favoring a bronchial origin. In many sec from different blocks the bronchi seem perfectly normal. T portions of the tumor within the lung are, as a rule, triang in shape with the base at the surface and apex in the d All are in direct connection with the growth on the surf the lung and transitions from the adenomatous tumor o surface to the adeno-carcinoma within the lung are evid most of the sections. The cells at the apices of the nodules lose their gland-like arrangement and infiltrat atelectatic lung as solid, slender strands of epithelial ce

We may reach the conclusion that we have a tumor, w cells are in general atypical, arising from epithelium of m blastic origin. However, it retains throughout its epit nature, never reverting to the connective tissue type. I adopt Adami's phraseology, we should speak of it as a tr tional lepidoma or a mesothelial carcinoma, since it arises f what he calls a transitional lining membrane or epitheli mesoblastic origin.

Since it varies so markedly from other reported pl tumors, we are not justified in making any broad genera tions. We should expect tumors of such origin to show variations.

EXPLANATION OF FIGURES.

1. Edge of one of the nodules on costal pleura. Leitz, Ob eyepiece 1.

2. Higher power of pleural epithelium shown in Fig. 1. Ob eyepiece, 1.

3. Villi on costal pleura between two larger tumor no Obj. 2, eyepiece 1.

4. Costal pleura between two nodules. Shows the neo also in the subpleural tissues. Obj. 2, eyepiece 1.

5. Base of a large costal nodule. Subpleural tissues sho lower part of figure. Intracystic papilloma. Obj. 2, eyepie

6. Higher power of part marked x in Fig. 5. The epithelial line corresponds in position to the serous coveri the pleura. Obj. 4, eyepiece 1.

7. From more superficial portion of same nodule show Figs. 5 and 6. Proliferation of cells tending to fill up the sp Obj. 4, eyepiece 1.

8. From highest point of nodule shown in Figs. 5, 6 an Advanced stage of process shown in Fig. 7. Solid epithelial separated by connective tissue strands. Obj. 4, eyepiece 1.

9. Visceral pleura with extension of tumor into lung. A exudate on surface, below which is a layer of granulation ti then small spaces lined by tumor cells, which extend furthe the lungs as an adenocarcinoma. Note atelectatic lung in left corner of figure. Obj. 2, eyepiece 1.

10. Higher power of part of Fig. 9. Obj. 4, eyepiece 1.

11. Nodules on surface of lung More regular adenom structure with papillomatous projections into lumen (right of figure). Tumor cells of less typical structure inv atelectatic lung (lower left). Obj. 4, eyepiece 1.

12. Deeper portion of adenocarcinoma invading atelectatic lu Obj. 4, eyepiece 1.

13. Metastasis to bronchial lymph node. Obj. 4, eyepie

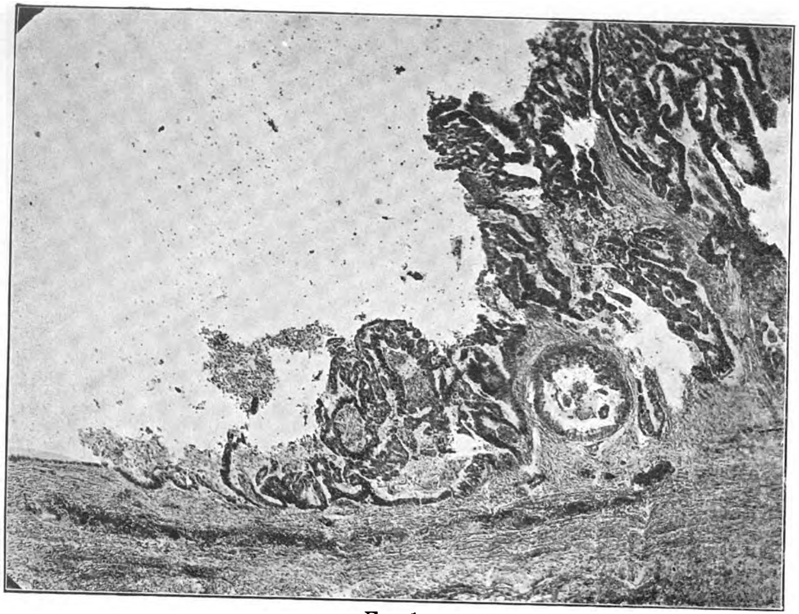


FIG. 1.

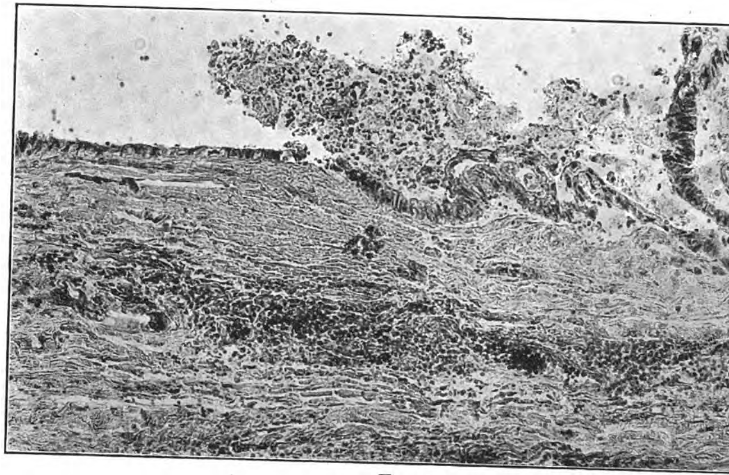


FIG. 2.

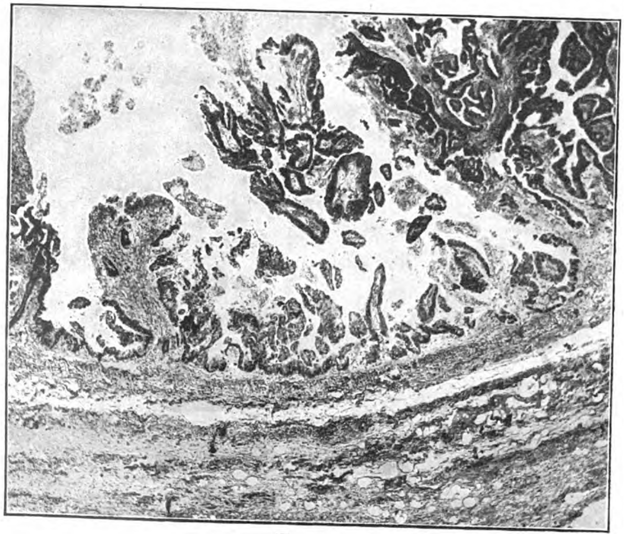


FIG. 3.

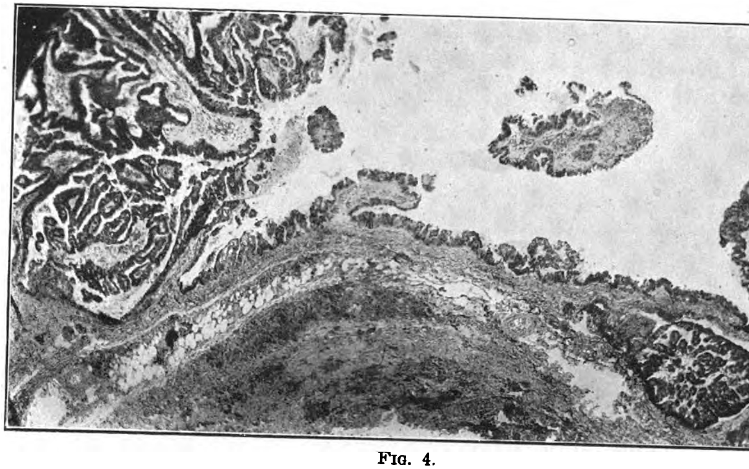


FIG. 4.

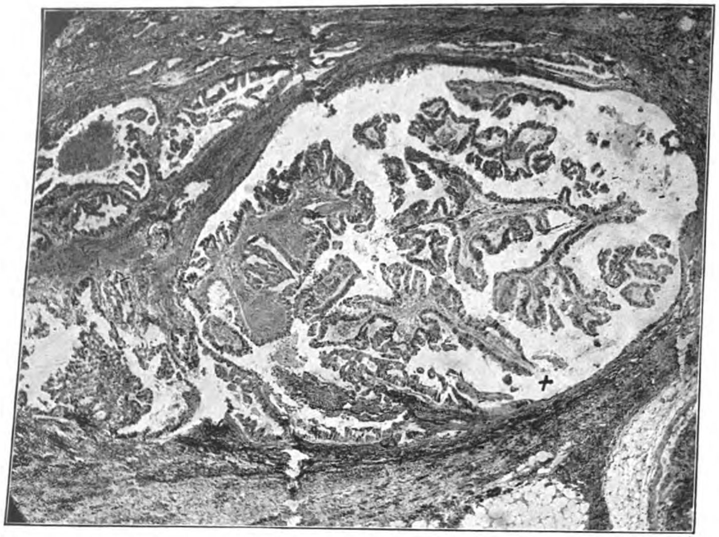


Fig. 5.

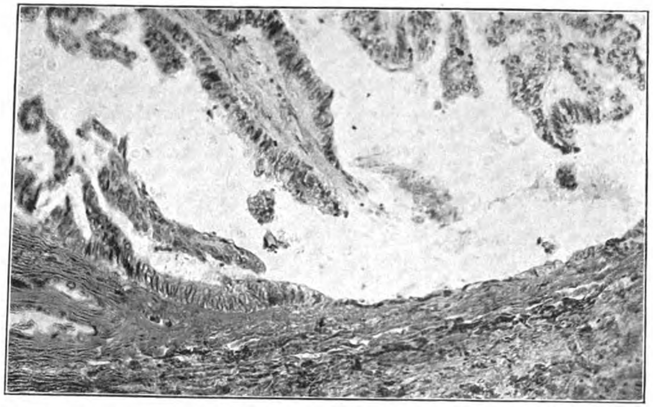
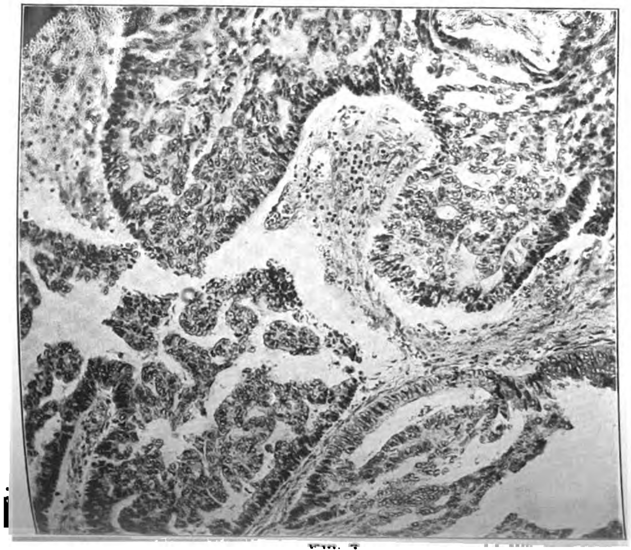
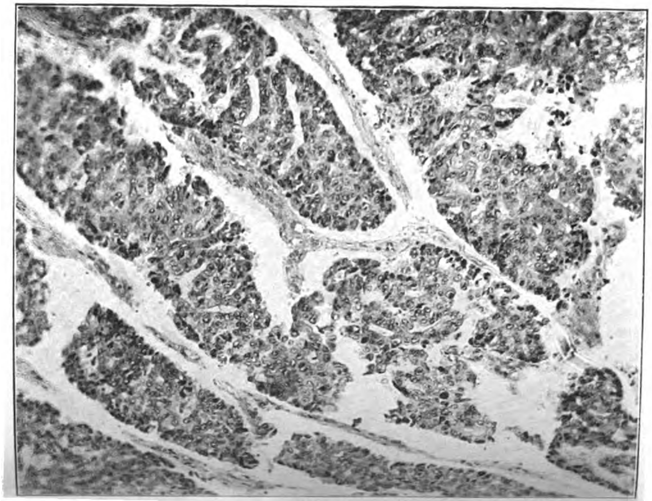


Fig. 6.





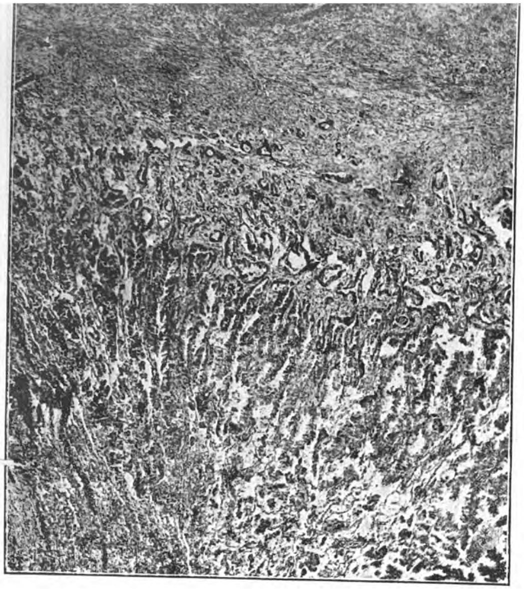


FIG. 9.

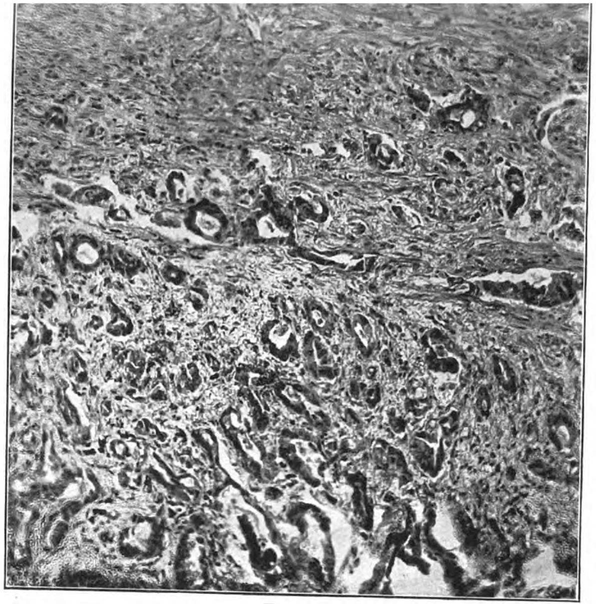


FIG. 10.

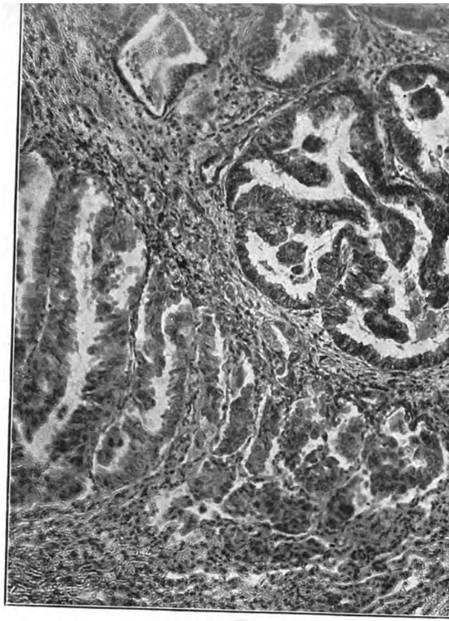


FIG. 11.

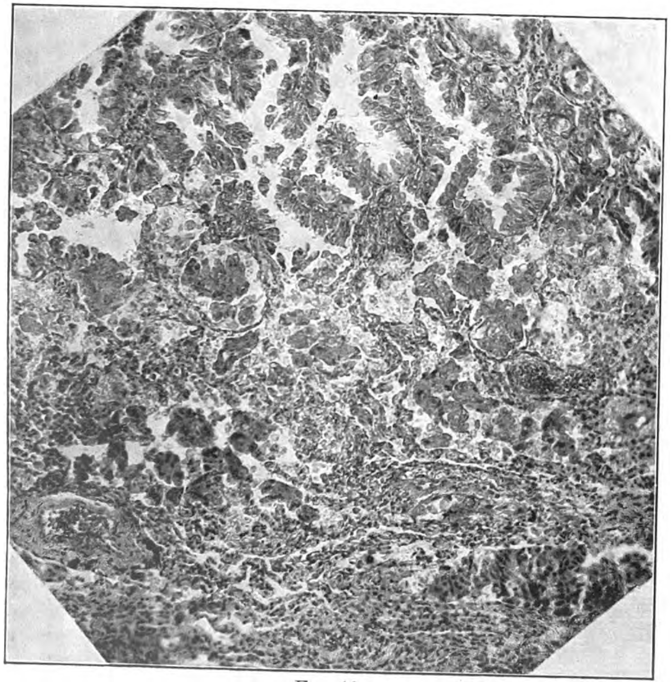


FIG. 12.

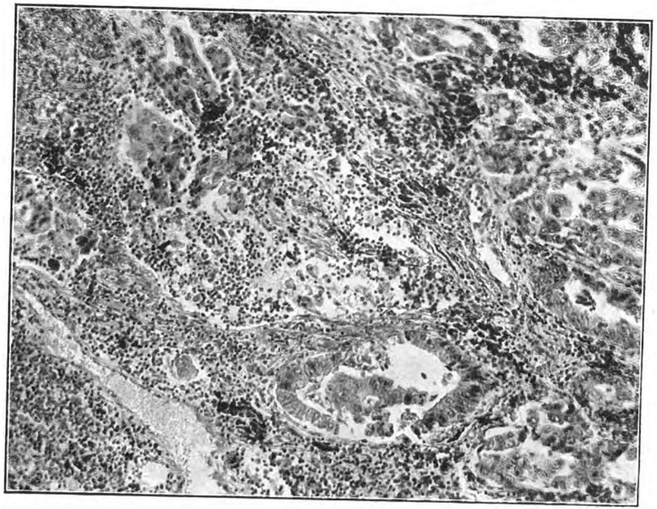


FIG. 13.

e: Respirationsorgane. Aschoff's Lehrbuch d. path. Anat., 09, II, 280.

: Primäre Carcinom der Pleura. Deutsche med. Wchnschr., 97, XXIII, 324.

Les néoplasmes malins primitifs de la plèvre. Thèse, ıris, 1905.

ın: Ueber den sogenannten "Endothelkrebs" der Pleura. augural-Dissertation. Bonn, 1909.

cel: Zur Klinik der Lungen und Pleurageschwülste (Enthelioma pleurae). Deutsche med. Wchnschr., 1911, XXVII, 531.

ıer: Ueber den sogenannten Endothelkrebs der serösen ıüte (Wagner-Schulz): Ztschr. f. Heilk., 1897, XVIII, 209.

oren der Pleura. Deutsches Arch. f. klin. Med., 1903, LXXV, 337.

Harris: A Contribution to the Pathology and Clinical Features of Primary Malignant Disease of the Pleura. Path. and Bact., 1894, II, 174.

Herxheimer: Ueber Sehnenflecke u. Endokardschwieen. Beitr. z. allg. Path. u. z. path. Anat., Jena, 1902, XXXII, 461.

Mönckeberg: Ueber das Verhalten d. des Pleuroperitonealepithels bei der Einheilung von Fremdkörpern. Beitr. z. allg. Path. u. z. path. Anat., Jena, 1903, XXXIV, 489.

Orth: Lehrbuch d. spec. path. Anat., Berlin, 1897, I.

Ribbert: Ueber Pleuratumoren. Virchow's Arch. f. allg. Path. u. path. Anat., 1909, CXCVI, 341.

PORT OF A CASE OF PUERPERAL INFECTION WITH ISOLATION FROM THE UTERUS OF *B. INFLUENZÆ* AND A NEW METHOD FOR MAKING BLOOD AGAR FOR ITS CULTIVATION.

By William Thalhimer, M. D.

(From the Pathological Laboratory of the University of Virginia.)

ce the discovery by Pfeiffer in 1892 of *B. influenzæ* with methods for its cultivation and recognition, the pread occurrence and importance of this organism have here been recognized. At first it was believed to affect he respiratory tract, but many cases are now on record ningitis, endocarditis with bacteræmia and middle ear due to this bacillus, which has also been recovered an infected gall bladder by Kinna and by Heyrovsky. om the urethra by Cohn. A search of the literature has ed, however, only one case where this bacillus was re- from the female genital tract. This is a case reported kault under the title "Influenzabacillen bei Pyo- und -Salpinx," and is briefly as follows:

ry.—Frau E., 40 years old, married 14 years, sterile. ears ago the patient was operated on for disease of the rary.* Since then has been troubled off and on with dyshœa. Has been under observation for three and a half and since yesterday has had severe abdominal pain, and st night has had slight bleeding from the uterus.

.—Uterus small, ante-dextroposed, resting upon the sym- and behind it is a massive exudate.

tion.—April 22, 1905. Posterior vaginal incision with autery and opening of both sides of exudate. From right ved pus and from the left bloody serum. Drainage in- April 26, drainage removed. Slight discharge, a little y 22, dilatation of opening. June 6, discharged. Uterus ed, still a slight exudate to right. Slight discharge.

copic examination of pus showed many extra-cellular, Gram negative bacilli. A small number of the same nd in the fluid from the exudate of the left side.

was a typical growth of colonies of influenza bacilli on aked agar and the same on agar smeared with pus. No growth, however, in bouillon and plan agar. Subcultures were easily grown on blood agar.

Additional History.—On further questioning, the patient said she had an attack of influenza eight or nine years previously, but none since then.

In light of this solitary finding in the literature the following case seems worthy of being placed on record.

Mrs. ———. Thirty-one years old. Admitted January 19, 1911.

Family History.—Negative, except that about one year ago the patient's husband was treated at the University Hospital for an acute unilateral gonorrhœal epididymitis, the gonococci being found in smears.

Past History.—Usual children's diseases and a severe attack of influenza 15 years ago when the patient was 16 years old. This lasted for two weeks, with pains in limbs, cough and purulent expectoration, but the patient was not forced to take to bed. There has been no attack of a similar kind since then, but patient is prone to catch cold, having several attacks every winter. Genito-urinary history negative, menstruation normal, never any abdominal pain. Patient has one child two years old; this pregnancy, labor and puerperium were normal.

Present Illness.—Four days ago after a normal pregnancy, patient passed through a normal labor, and felt tolerably well after the child was born, not feeling badly till three days afterwards, when she was troubled with a severe pain in the lower abdomen. She had no chills at this time but later in the night had several, and after each one felt feverish. The next day a physician was called who advised her to enter the hospital.

Status Præsens.—On admission patient's temperature was 105.4° F., pulse 140, respiration 30, and leucocytes 12,400. Except for tenderness in lower abdomen, especially on right side with slight muscle spasm, physical examination was negative. No mass could be felt.

Local Examination.—Patient taken to operating room, prepared for vaginal examination. Culture taken from uterine cavity on plain agar. Uterine cavity then investigated with little finger and no retained secundines found. Uterus was the size of normal involuting uterus at this period and no pelvic exudate was felt.

---

ature of this ovarian disease is not stated and therefore le relationship between it and the attack of influenza, in the additional note, cannot be determined.

Course in Hospital.—A moderate sized, firm, pelvic exudate developed in the right broad ligament in two days, and was palpable and tender in the right iliac fossa. Temperature fell in three days to about normal and after that ran an up and down course, patient having chills on second and third days. Patient left hospital, against advice, 26 days after admission, still having an irregular low temperature and slight pelvic exudate, but the mass palpable in the right iliac fossa had disappeared.

Note Three Months Later.—Patient has had no further symptoms since leaving the hospital and now feels entirely well.

Blood culture, January 19, 1911, 4 P. M., was negative.

Bacteriology of Culture from Uterus.—After 24 hours incubation, the culture tube showed no visible growth, but a dulling of the entire surface. Smears revealed practically a pure culture of a very minute, slender bacillus and a few cocci in chains. Subcultures on blood agar gave in 24 hours a profuse growth of minute, discrete dew drop colonies and three or four raised, opalescent colonies, 1 mm. in diameter. The former proved to be the minute bacillus and the latter the coccus. These two organisms were isolated with difficulty by streaking them on blood agar tubes, and the coccus demonstrated to be a streptococcus. Its pathogenicity was not determined. The small bacillus grew as above on blood agar only, and did not grow on bouillon, serum bouillon, plain, glucose, and plain serum- and glucose-serum-agar, litmus milk, potato, and gelatin. It was Gram negative, stained densely and best with carbol-fuchsin diluted in water, and was then seen as a very minute slender bacillus, showing a very polymorphic appearance, sometimes straight, sometimes comma-shaped, and varied from coccoid forms, some at the limit of visibility, to bacilli from 0.5 to 1.0 μ long. In all the subcultures this variation in form and size was noted. From the above data the diagnosis of *B. influenzæ* was made. This organism was sent as an unknown to Dr. George Baehr, of the Pathological Department of the Mount Sinai Hospital, New York City, and this same diagnosis arrived at by him.

The finding of the *B. influenzæ* in the case cannot definitely be explained, and to attribute it to the attack of influenza, 15 years previously, would certainly not be justifiable. But the similarity of this history to that of the only other recorded case is either to be considered as quite suggestive or else a rather unusual coincidence. The other possibilities to be considered are an accidental infection at the time of labor or else an infection of some portion of the patient's genital tract with a streptococcus and the *B. influenzæ*, previous to labor. This may have occurred from coitus with her husband who was suffering from the venereal infection, but the *B. influenzæ* in this latter condition is also uncommon. What part of the infectious process was due to the influenza bacillus and what to a streptococcus could not be determined, but from the predominance of the bacilli in the first culture tube, the surmise is justifiable that the *B. influenzæ* was also the main factor in causing the pelvic infection. It is interesting that the blood culture taken at the height of the temperature was negative.

The second part of this report concerns itself with a new blood agar medium for the cultivation of the *B. influenzæ*, but before proceeding with this it may be worth while to review briefly the history of blood media in relation to this organism.

* The isolation of the *B. influenzæ* is very difficult and was first performed by Pfeiffer. This he did by smearing tubes with pus from patients' bronchial secretions. From the cultures he was unable to secure growth in subinoculated agar tubes and realized that growth in the first cultures due to some constituent in the pus. After trying many he secured typical growth on an agar tube whose been smeared with a drop of human blood removed Next he undertook to find what constituent of blood necessary one. He found that the *B. influenzæ* grow on human blood serum but would grow on red made from washed red blood corpuscles. The final step discover what constituent of the red blood cells was the tial one. Accordingly he laked some washed red blood either by alternate freezing and thawing, or by addition ether, which was later removed by evaporation in a The stroma of the red blood corpuscles was removed by tion through a "kieselgur" filter. The clear, chemically blood coloring substance, dissolved in 0.6% saline solution added in an amount of one drop to each tube of agar. tubes were inoculated with the *B. influenzæ* and colonies peared as numerous on them as on blood agar. Growth occurred in hemoglobin bouillon, but not in tubes of mixed with stroma of red blood corpuscles from which hemoglobin had been removed.

Since this work other media for growing the *B.* have been invented, but none are as satisfactory as blood

Beck, a student of Pfeiffer, continued this work and that blood agar made from pigeon's blood was the one favorable for this organism's growth, it growing more on human and rabbit blood agar. Nastjukoff reported of the *B. influenzæ* in pure culture on media of yolk of claimed this was due to hematogen, which he isolated Voges, after many experiments, was unable to verify this of Nastjukoff. Capaldi also refutes this work because found that the *B. influenzæ* grew very poorly on agar he added lecithin or hematogen. Cantani reported growth on agar streaked with semen of animals, and that his work shows that the growth of the *B.* be attributed to hemoglobin alone, but is also due to and serum albumin substances which occur naturally in Kolle and Delius obtained good growth, especially on the tom of the flask, when 0.25 to 0.5 cc. of pigeon's blood added to 30 cc. of bouillon, this shaken, and then frozen thawed to get the corpuscles laked and the hemoglobin in tion. Grassberger thinks that one gets better growth of *influenzæ* in symbiosis with staphylococcus or on which staphylococcus was previously grown. Cantani that the *B. diphtheriæ* and gonococcus promoted growth *B. influenzæ*, and Neisser grew it in symbiosis with the bacillus. Ghon and Preiss could not cultivate the *fluenzæ* on hemoglobin free media, but obtained growth on hemoglobin agar. Richter investigated the of the *B. influenzæ* on the following media with results: sterile sputum, sterile bile, yolk of eggs, and Schmiedeberg's ferratin.

---

* The following is extracted mainly from the article on Influenza by Beck, in Kolle and Wasserman's Handbook, Vol. III.

on to a solution of hematogen in water till the reaction is ngly alkaline. Boil or steam, sterilize, and filter; the pre- tate is separated from the filtrate which latter is a bright fluid and can be sterilized in an Arnold steam sterilizer, iout coagulation or injury. This sterile preparation is ed to sterile liquid agar at 50°-60° C. and tubed. The atogen must be sterilized separately because the original linity must be preserved so that it will not coagulate when ed to 100° C. Huber reports that the growth is less luxu- t and slower on this medium than on blood agar, taking 1 2 to 8 days to become visible, but the *B. influenzæ* seems emain alive longer, he having made successful subcultures he end of 35 days from a surface inoculated tube and at end of 60 days from stab cultures. This work is impor- for it shows that oxyhemoglobin is not necessary for rth of the *B. influenzæ*, but merely the iron radicle of the oglobin.

ne other medium is worthy of note: that of Bernstein and tein from the Pathological Laboratory of Mount Sinai pital, New York. This is made from whole beef blood not from a definite blood or hemoglobin product. It is e as follows: "400 cc. of beef blood are drawn directly a 500 cc. Erlenmeyer flask containing 30 cc. of a 1% solu- of ammonium oxalate (to prevent clotting) and 0.5 cc. of ialin of 40 volume strength. The flask is shaken for two ites. Thirty minutes are required for sterilization of the l, which is then transferred in small quantities into sterile nmeyer flasks and diluted with twice its volume of 0.9% le saline solution. This dilution reduces the actual alin content to one part in 2400 of blood. This is allowed and for 24 to 48 hours for diffusion of formalin and then d to agar or bouillon in proportion of one part to fifteen. iriant growths of pneumococcus, meningococcus, gono- s and influenza bacillus are readily obtainable."

résumé of these methods shows that the only media on 1 one can consistently and readily cultivate the *B. in- zæ* are those containing fresh blood, or hemoglobin ob- l from fresh blood; for the slow growth on Huber's hema- media cannot be considered satisfactory. The method by Pfeiffer for obtaining hemoglobin is rendered compli- by the necessity of a freezing and thawing process or else e necessity of evaporating the ether in a vacuum, pro- es too cumbersome for use in routine manufacture of tory media. The method of Bernstein and Epstein is tain in yielding sterile media but when this is accom- l the media is very satisfactory. It is to be regarded with skepticism if 30 minutes contact with formalin in a dilu- of 1 to 860 is sufficient to sterilize the blood used. ecent work of Post and Nicoll, which the author working Ir. Palmer has been able to confirm, would indicate that lin is inefficient as a bactericide at this dilution, in this of time.

od agar is usually made from blood obtained from a l patient. This is withdrawn with a syringe from the venience of this method and the difficulty of obtaining permission to get this blood, even when the laboratory is associated with a hospital is evident.

The two following methods were investigated in an attempt to provide a simple laboratory method for making a hemoglobin or blood medium capable of growing the *B. influenzæ*. Only the second one, however, proved successful.

The first investigation was an attempt to utilize a beautiful crystalline hemoglobin product, obtained from Armour and Company through the courtesy of their laboratory. A solution of this coagulated at 60° C., forming a muddy precipitate in a colorless fluid and was, therefore, impossible to sterilize when in solution. It was found that the material underwent no change when heated in a hot air oven at 115° C. for one hour, but this procedure did not yield a sterile product for, although it was tried a number of times, in every case when dissolved in sterile distilled water and streaked on agar, in a 24-hour aerobic culture, a profuse growth of a large spore-forming bacillus occurred. This organism was not identified. A solution of unheated hemoglobin in distilled water was next freed from bacteria by passing it through a sterilized Reichel filter. This gave a solution, brownish red by transmitted light, which was added to tubes of melted agar at 45° C. in quantities sufficient to give a light brown medium, of about the same density of color as ordinary blood agar. There was always plenty of water of condensation present, and although many inoculations were made of a strain of the *B. influenzæ* and the strain isolated from the above patient, in no case was a visible growth observed, though usually in 24 to 48 hours many typical forms could be demonstrated in smears made from the surface of the inoculated tubes, and in a few cases successful plants were made from these tubes to blood agar tubes and tubes of the media made by the second method. This is not considered as evidence of growth on this hemoglobin agar, but rather a proof of just the opposite. Certainly this is not practicable as a laboratory medium.

Second method: Freshly drawn beef blood obtained from an abattoir was collected in a wide mouthed jar and defibrinated by shaking with a number of medium sized marbles. This was laked by adding an equal part of distilled water and rendered free from bacteria by passing through a sterile Reichel filter as above. This yielded a beautiful, clear, red fluid and 20 to 30 cc. of this were added to a liter of sterile melted agar at 45° C. and poured into sterile tubes. The medium which resulted was also perfectly clear, bright red and of the same density of color as ordinary blood agar. On this medium the two organisms, which were unsuccessfully tested on the hemoglobin agar, were successfully passed through 10 subcultures. The growth occurred in 24 hours, and was typical of the *B. influenzæ*, occurring luxuriantly in small, discrete, dewdrop colonies. Smears showed the typical morphology. Pneumococcus, streptococcus, streptococcus mucosus and gonococcus also grew luxuriantly.

This method is a modification of former methods, notably that of Pfeiffer, and is believed to be the simplest yet devised for making blood agar. Its chief advantage over that of Pfeiffer is that the laking agent is one which does not interfere with growth of bacteria and does not have to be removed. From 40 to 50 cc. of this laked blood can be filtered in 24 hours through a Reichel filter of 50 cc. capacity. Where a larger quantity is needed a larger filter can be used. It is evident that the hemolytic qualities of an organism cannot be tested with this medium.

In conclusion the author wishes to express his indebtedness to Dr. H. T. Marshall for his helpful suggestions in this work, and also to Dr. George Baehr for the strain of the *B. influenzæ* used in this work and for his report on the organism which was isolated from the case reported.

The opportunity to study the above case was afforded the author by Dr. Makin, in whose service at the University of Virginia Hospital the patient was treated.

BIBLIOGRAPHY.

Bernstein, Eugene P. and Epstein, Albert A.: A simple method of sterilizing blood for cultural purposes. J. Infect. Dis., 1906, III, 773.

Cantani, A.: Die Verwendung des Sperma als Nährbodenzusatz. Centralbl. f. Bakt., 1897, XXII, 601.

Capaldi, A.: Zur Verwendung des Eidotters als Närhbodenzusatz. Centralbl. f. Bakt., 1896, XX, 800.

Cohn, P.: Eine primäre, nicht gonorrhoische Urethritis mit auffallend reichlichen Influenzabacillen. Deutsche med. Wchnschr., 1905, XXXI, 1152.

Delius, W. and Kolle, W.: Untersuchungen über Influ munität. Ztschr. f. Hyg. u. Infectionskrankh., 1897, XX 327.

Ghon, A. and Preiss, W.: Studien zur Biologie des Infl bacillus. Centralbl. f. Bakt., 1902, XXXII, 90.

Grassberger, R.: Beiträge zur Bakteriologie der Infl Ztschr. f. Hyg. u. Infectionskrankh., 1897, XXV, 453.

Heyrovsky, J.: Der Influenzabazillus als Erreger der Cho titis. Wien. klin. Wchnschr., 1904, XVII, 644.

Huber: Ueber den Influenza-Bacillus. Ztschr. f. Hyg., 1892 454.

Knina, O.: Der Influenzabazillus als Erreger der Chole Wien. klin. Wchnschr., 1909, XXII, 1234.

Kisskalt, K.: Influenzabacillen bei Pyo- und Hydrosal Centralbl. f. Bakt., 1906, XLI, 701.

Nastjukoff: Ueber Nährboden aus Eigelb für Bakterien-kult Vrach, St. Petersb., 1893, XIV, 825, 892, 916.

Neisser, M.: Ueber die Symbiose des Influenzabacillus. Deut med. Wchnschr., 1903, XXIX, 462.

Pfeiffer, R.: Die Aetiologie der Influenza. Ztschr. f. Hyg. fectionskrankh., 1892., XIII, 357.

Pfeiffer, R.: Vorläufige Mittheilungen über die Erreger de fluenza. Deutsche med. Wchnschr., 1892, XVIII, 28.

Pfeiffer, R. and Beck, M.: Dr. Bruschettini und der Infl bacillus. Deutsche med. Wchnschr., 1893, XIX, 816.

Post, W. E. and Nicoll, H. K.: The comparative efficiency of se common germicides. J. Am. M. Ass., 1910, LV, 1635.

Richter, M.: Zur Aetiologie der Influenza. Wien. klin. W schr., 1894, VII, 529.

Thalheimer, W. and Palmer: The bactericidal efficiency of nine and some common disinfectants. J. Inf. Dis., 1911. published.

Voges, O.: Beobachtungen und Untersuchungen über Influ und den Erreger dieser Erkrankung. Berlin. klin. Wchns 1894, XXXI, 868.

HYPERLEUCOCYTOSIS OF HIGH GRADE IN BRONCHO-PNEUMON IN A CHILD.

By Charles R. Austrian, M. D.,

Assistant in Medicine, The Johns Hopkins University.

(*From the Medical Clinic of The Johns Hopkins Hospital.*)

On November 23, 1909, C. R., a colored child aged four years, was admitted to the Johns Hopkins Hospital, complaining of "cough and pain in the stomach and throat." The past history was negative, except for measles and chicken-pox one year ago. The illness which brought the patient for treatment began on November 9, fourteen days before admission, with cough—at first unproductive, occurring in nocturnal paroxysms, at times so severe as to induce vomiting, and later becoming more frequent with the expectoration of tenacious mucous sputum which was never blood-tinged. There had also been fever, night sweats, anorexia and constipation.

The child was small, fairly well nourished, with marked dyspnea and tachypnea, respirations fluttering, 100 to the minute. The alæ nasi were dilating, the lips cyanosed, and with each expiration there was a short grunt. The head was negative; there was no mastoid tenderness, nor signs of aural or meningeal disease. There was moderate general glandular enlargement.

The thorax was rounded; a rickety rosary was palpable; there was a tendency to "pigeon breast." The respi movements were mainly abdominal and the thoracic expa was limited on the right side. The vocal fremitus wa tested. Percussion revealed Skodaic resonance at the righ tympany over the upper portion of the right lower lobe, impaired resonance in the axilla, merging into dulne the base behind. On the left side Skodaic resonance was ent over the front as far as the third rib, though ther normal resonance below. Behind, dulness was presen the apex to the mid scapular region; there was slightl paired resonance as far as the angle of the scapula, and resonance below. There was nowhere absolute flatnes auscultation, intense tubular breathing was heard over upper fronts and backs, also over the lower right back. numerous consonating crackles were audible in the dul at the end of inspiration. Over the middle and upp of the right lower lobe medium and coarse moist rale a leathery friction rub were heard.

The cardiac dulness was not increased. There was below the costal margin in the right mammillary line, re a firm edge was readily palpable.

n November 24, there was a generalized clonic convulsion unconsciousness, blepharospasm, turning of the head and jugate deviation of the eyes to the left, and loss of sphincter rol. After it had lasted fifteen minutes, the paroxysm aborted by immersing the child in a hot mustard bath.

y November 27—the eighteenth day of the illness—the s of consolidation at the apices had practically disaped, but dulness, with tubular respiration and crepitation, still present over the right lower axilla and back, and for the first time a to-and-fro friction rub was audible this area. The signs of consolidation were made out on left side, from the apex to the angle of the scapula, and over the lower front and axilla, where too there was a ery rub. Two days later, the condition was more grave, over the right mastoid, involving the tissues over an about 5 cm. in circumference from its tip, there was a ruptured bleb with brawny induration and tenderness t it, and the associated lymph glands were tender and len. The right tympanum was now tense, red, and rless. At 7 p. m. the child began to vomit and at 7.25 . suddenly expired.

uring the disease the temperature ran an irregular course nd 103° F., showing marked remissions after the sponges, fever occasionally falling as much as 3°F. in two hours. pnea was marked and persistent, the respiratory rate ing from 60 to 106 to the minute. Tachycardia was also ounced, the pulse ranging from 140 to 195 to the minute.

is clinical picture is common—a case of pneumonia with of its most usual complications, mastoiditis—but the l findings make the case of interest.

admission, the red blood cells numbered 4,860,000 mm., the hæmoglobin was 87 per cent (Sahli) and the cytes 130,000 per cmm. Seven hours later, the leucocytes 144,000 per cmm.; on the morning of November 24, had increased to 183,000 per cmm. and that evening ed a maximum of 206,000 per cmm. During the ving four days they varied between 126,000 and 156,000, vith the onset of the mastoiditis again rose to 192,000 mm.

e marked leucocytosis caused us to suspect the presence purulent focus, or the possibility of a leucemia with a nal pneumonia. The former we had no reason to e, inasmuch as there were no signs of pus anywhere, idence of an empyema, of a sinus infection, of otitis or stoiditis, the latter not appearing until the day of death. sible leucemia was excluded by the differential counts:

lich Stain.—The red corpuscles showed very little poly-atophilia, no marked anisocytosis or poikilocytosis, few blasts and no megaloblasts. The white cells, in general, readily classified, one type, however, being difficult to fy, *i. e.*, a rather large cell with pale homogeneous, pinkng, non-granular cytoplasm, and a slightly lobulated

In 500 cells counted there were:

	Nov. 24.		Nov. 26.		Nov. 28.		Nov. 29.	
	Cells.	%	Cells.	%	Cells.	%	Cells.	%
Polymorphonuclear neutrophiles	260	52	280	56	300	60	270	54
Polymorphonuclear eosinophiles	20	4	15	3	10	2	15	3
Lymphocytes	120	24	105	21	100	20	110	22
Large mononuclears..	3	0.6	8	1.6	10	2	20	4
Transitionals	15	3	10	2	5	1	10	2
Myelocytes	60	12	70	14.0	50	10	60	12
Unclassified	22	4.4	12	2.4	25	5	15	3
	500	100.0	500	100.0	500	100	500	100

In 500 white cells counted there were:

Normoblasts	4	6	2	9
Megaloblasts	—	—	—	—

The relative lymphocytosis is not unusual during an acute infection in a child of four, and the presence of 12 per cent of myelocytes does not necessarily militate against a diagnosis of leucocytosis as differentiated from leucemia (Cabot, Musser and Steven). Moreover, the absence of a marked anæmia and the post mortem findings exclude a leucemic process.

The post mortem findings were as follows (Dr. Winternitz):

Anatomical Diagnosis. — Broncho-pneumonia, bilateral. General lymphoid hyperplasia and hyperplasia of the bone marrow. Acute mastoiditis, right, with thrombosis of the superior petrosal sinus and of the adjacent sinuses of the brain. Congestion of the brain, especially of the right hemisphere. Cloudy swelling of the liver and of the kidneys.

The body is that of a fairly well nourished child 93 cm. in length. Rigor mortis is present. Over the right mastoid there is swelling with reddening of the skin, the upper layers of which are broken.

The peritoneal cavity is normal except for a great enlargement of the mesenteric lymph glands, which, on section, have a gelatinous, homogeneous appearance.

The left pleural cavity contains a slight excess of straw-colored fluid; the right is partially occluded by recent fibrinous adhesions.

The thymus is small and pinkish brown in color.

The heart is not enlarged; the myocardium and the valves are normal.

Lungs: the left lung is pale, voluminous, and retains its shape after removal. It is everywhere crepitant except over a few small areas of consolidation in the posterior portion of the lower lobe. The bronchi contain an excess of fluid, and the bronchial lymph glands are much enlarged. Right lung: the pleural surface is covered with a friable grayish exudate which is several millimeters in thickness. Two-thirds of the lower lobe is occupied by areas of consolidation which, on section, are dry, granular, and slightly translucent, and there are a few small areas of like character in the upper lobe.

The spleen measures 9 x 4 x 2 cm. and retains its shape after removal. Its capsule is delicate and the red splenic pulp is seen through it. On section, the Malpighian corpuscles are gray and tremendously enlarged; so much so, that neighboring ones are almost in contact. Neither the fibrous tissue nor the pulp is much increased.

The stomach, the duodenum, the pancreas, and the intestines are normal. There is no hyperplasia of Peyer's patches or of the solitary follicles.

The liver measures 19 x 12.5 x 5 cm. The capsule is thin and delicate. The liver parenchyma is purple in color, and on section the lobules are large and distinct. The gall bladder is normal.

The brain: the dura mater is thick and adherent. The right cerebral hemisphere is covered with dilated vessels; the left is pale and only a few of the vessels are injected. The superior and inferior petrosal sinuses on the right are distended and filled with thrombi. There is a large amount of pus in the spongy portion of the bones of the right middle ear, and the ossicles lie free in a necrotic sequestrum. The brain tissue is normal except for the congestion of the right hemisphere.

Microscopic Examination.—Lungs: the pleura is covered by an exudate consisting mainly of polymorphonuclear leucocytes. The alveoli of the lungs are filled with an exudate varying from a very cellular material in which mononuclear cells predominate, to one almost purely fibrinous in character, and where the latter type is present the alveolar walls are involved. In places there are zones of coagulation necrosis.

The thymus shows well preserved gland tissues with conspicuous Hassal's corpuscles.

Sections of several lymph glands show a marked dilatation of the sinuses, in which there are many large mononuclear cells with pink-staining cytoplasm and vesicular nuclei. A few of these cells show definite granular inclusions. The lymphatic strands are coarse and show an increase of the mononuclear elements. The centers of the lymph follicles stain deeply and uniformly with eosin.

In the anterior and middle portions of the hypophysis are cyst-like areas which contain colloid in excess, and in one of these areas there is a fibrous thickening in which there are a few typical mucous glands.

The liver cells are swollen and there is an infiltration of the parenchyma with mononuclear cells, some of which have deep pyknotic nuclei. Polymorphonuclear leucocytes are less numerous, and only an occasional myelocyte is seen. The stellate cells of Kupfer are enlarged, and in some places have taken on phagocytic activity. The predominating cell in the blood clots is the large mononuclear lymphocyte.

The bone marrow shows marked hyperplasia, but there are still some areas of fat remaining. In the smears and sections the large neutrophilic myelocyte is the predominant cell. The erythroblastic tissue is increased somewhat less than the myeloblastic and relatively few normoblasts and megaloblasts are seen. The polymorphonuclear neutrophiles are relatively few and there are many giant cells. With Ehrlich's stain only a few myeloblasts are seen. In the marrow there are several small areas of hæmorrhage, and near the areas of softening a few small thrombi are found.

Hyperleucocytosis in the sense of excessive leucocytosis is not uncommon and counts of 80,000 or more leucocytes per cmm. have been reported in many conditions. Leuc[illegible]mias of over 100,000, except in leucemia, however, are comparatively rare. The following may be cited as the maximum counts found in a cursory survey of the literature on the subject:

Limbeck,[1] quoted by Sisto,[2] noted a leucocytosis of 1[illegible] in a patient with multiple carcinoma, and Kast reported an identical count in a similar condition.

Hirschfeld and Kothe[3] report a leucocytosis of 1[illegible] (56 per cent polymorphonuclears and 7 per cent myelo[illegible] in a case of appendicitis gangrenosa complicated by hæmorrhage from a duodenal ulcer. This is a most phenomenal finding, as may be seen from the exhaustive study [illegible] Busse.[4]

Felsenthal[5] counted 148,229 leucocytes per cmm. in a [illegible] with gangrenous diphtheria and petechiæ.

Osler[6] cites a case of lobar pneumonia with 114,000 w[illegible] cells, and Læhr, quoted by Emerson,[7] Arneth and T[illegible] found 115,000 leucocytes per cmm. in a similar case, and these authors could find no more marked leucocytosis in pneum[illegible] reported in the literature as late as 1904. Cabot[8] menti[illegible] a case of broncho-pneumonia complicating pertussis, in a girl aged six years, where the leucocytes reached 94,6[illegible] cmm. and another case where they were 185,000 per c[illegible]

The most marked leucocytosis in pneumonia in the r[illegible] of the Johns Hopkins Hospital is 105,000 per cmm. i[illegible] man aged 25 years.

Fletcher and Sappington[10] reported a case of spleno-hepat[illegible] cirrhosis in which there was a leucocytosis of 136,000 per c[illegible] (89 per cent polymorphonuclears) and this is cited by Ca[illegible] as the most marked polymorphonuclear leucocytosis he c[illegible] find on record.

Those who have reviewed the literature on leucocytosis [illegible] to have overlooked an article by Steven[12] on broncho-pneumonia in childhood, in which a case is reported with [illegible] leucocyte count of 236,000 per cmm. (33.6 per cent polymorphonuclear, 50.2 per cent lymphocytes, 15.2 per cent la[illegible] mononuclears, 0.57 per cent eosinophiles). This case, it [illegible] seen, is practically identical with the one here described, [illegible] a child twenty-two months old, with cyanosis, dysp[illegible] tachypnea (103 to minute), crepitant râles over both lun[illegible] and convulsions.

To sum up, we have here a phenomenal hyperleucocytosis occurring in a case of broncho-pneumonia in childhood.

The formula as determined by repeated differential cou[illegible] shows a marked mononucleosis and a moderate myelocytosis—a picture neither uncommon nor unique in this disease.

Leucemia is definitely excluded by the history, by the physical findings and by the necropsy.

The case seems worth recording, as this hyperleucocytosis is second only to that reported by Steven in a similar cas[illegible]

REFERENCES.

1. v. Limbeck, R. R.: Pathology of the Blood. New Sydenham Society, 1901, 174.

2. Sisto, P.: Contribuzione allo studio delle pneumoniti asteniche. Policlin., Roma, 1907, XIV, sez. prat., 993.

[redacted]se, W.: Die Leukocytose eine Schutzvorrichtung des 'pers gegen Infektion. Arch. f. Gynaek., 1908, LXXXIX, 1-120.

Felsenthal, S.: Hæmatologische Mittheilungen. Arch. f. derh., 1892-93, XV, 78-91.

Osler, W.: American Text-Book of the Theory and Practice Medicine, 1894, 212.

Emerson, C. P.: Clinical Diagnosis, 1906, 568.

9. Cabot, R. C.: Clinical Examination of the Blood, 1901, 114, 195.

10. Fletcher, B. K., and Sappington, S. W.: Spleno-hepatic fibrosis with a remarkable leucocytosis. Am. Med., Phila., 104, VIII, 239-242.

11. Cabot, R. C.: Osler's Modern Medicine, 1907-10, IV, 1608.

12. Steven, J. L.: Acute Infantile Broncho-Pneumonia. Lancet, 1902, II, 791-795.

IE VIABILITY OF PARASITIC OVA IN TWO PER CENT FORMALIN, WITH ESPECIAL REFERENCE TO ASCARIS LUMBRICOIDES.

By Roger S. Morris, M. D.

Associate in Medicine, The Johns Hopkins University.

(*From the Clinical Laboratory of The Johns Hopkins Hospital.*)

t has been a routine procedure for several years in the ical laboratory to preserve stools, for purposes of demon- tion, with formaldehyde. The fæcal material is finely ıminuted in water so that a relatively thin suspension is ıred. Commercial forty per cent formalin is then added he fæcal suspension in such quantity that the resulting ture contains the reagent in a strength of two per cent. most purposes stools are well preserved in this way and n tightly stoppered in bottles, may be kept for an almost finite period. Putrefaction and fermentative changes inhibited successfully.

'he chief purpose for which we have employed formalin been the preservation of material containing parasitic Eggs of the commoner cestodes of man—Tænia saginata, nenolepis nana, and Dibothriocephalus latus, have retained r morphology fairly well, though the thin-shelled ova of last two have shown greater alteration than those of ıia saginata. To all appearances, the eggs have been killed, o evidence of further development has been observed.

rematode material has been more scanty, as we have only specimens of Schistosoma hæmatobium and Schistosoma nicum. The former has shown less change in shape, and oth specimens the eggs appear to have been killed.

ith nematode ova, there have been rather interesting lts. The eggs of the hook worm, Ankylostoma duodenale Necator americanus, exhibit a certain amount of distor- of the shell. The formalin apparently does not kill the ıt once. Fæces containing eggs in the two-, four-, and -cell stages have been found later to have ova which in ıajority of instances have passed beyond this stage, though ı must be reasonably prompt, as we have never found yos within the shell or free in the fæces. Inasmuch as ame stool has been examined by eighty to ninety or more nts simultaneously, some of whom have studied several ırations, it seems probable that embryos would have observed, if present. Eggs of Trichuris trichiura and yuris vermicularis have presented no signs of develop- in fæcal suspensions containing two per cent formalin.

Findings of special interest have been met with in connection with the ova of Ascaris lumbricoides. In January of 1909, while demonstrating a stool containing the eggs of Ascaris lumbricoides to the class, it was noted that many of the ova contained embryos which frequently exhibited active motility within the shell. The stool was of unknown source, unlabeled, and had been on a shelf exposed to the light but not to the direct rays of the sun for an unknown length of time. It had probably been preserved with formalin (odor). The same specimen was demonstrated to classes in June, 1909, January and June, 1910, and again in January, 1911, and on each occasion actively motile embryos were observed within the shell. In fact, they were so numerous that there was practically no difficulty in demonstrating them in every preparation examined. Embryos which were well preserved but non-motile during the short period of inspection were much more abundant than those seen in a state of active motility. Often an ovum containing a living embryo had lost the albuminous envelope. A few embryos which had escaped from the shell were observed but in all instances they were dead. An examination of the stool on May 19, 1911, demonstrates that living embryos still persist, *i. e.*, about twenty-nine months after they were first observed in the specimen. How much longer they have been there it is impossible to say.

An opportunity to confirm the results just narrated presented itself some time ago. O. R., Surgical No. 25086, white, æt. 13, was admitted to the surgical service of Professor Halsted on December 4, 1909, on account of double cataract. The routine fæcal examination disclosed the presence of "many Ascaris lumbricoides ova in the stool." The eosinophiles amounted to seven per cent. On December 9, 1909, a specimen of fæces was suspended in water and formalin was added so that it was present in a strength of two per cent. Microscopic examination at that time showed an enormous number of ova of Ascaris lumbricoides, both fertilized and unfertilized, the former predominating. The stool was demonstrated to the class in January and June, 1910. The ova were well preserved and no suggestion of embryo formation was noticed, although carefully looked for. January, 1911, the specimen was used again for class demonstration and at this time a few fertilized ova were found which contained embryos, some of them actively motile. On May 19, 1911, examination of the specimen shows an *apparent* increase in the number of eggs which possess embryos, and in the first preparation studied an active parasite was seen. All seem to be well preserved morphologically and in the more mature embryos it is probable that prolonged inspection would reveal definite signs of life. Since the specimen was first obtained, it has been kept in a brown glass bottle, securely corked, on a shelf in the laboratory where it has been constantly exposed to the light but, like the preceding specimen, protected from the direct rays of the sun. It is unfortunate that examinations have not been made at more frequent intervals to determine how soon the living embryos first appear. They probably developed sometime between the sixth and thirteenth month.

That the ova of Ascaris lumbricoides are extremely tenacious of life has long been known. Davaine[1] showed that the eggs may be viable and still exhibit no sign of development for a considerable period of time. From the fæces of an infected child he recovered the eggs of Ascaris lumbricoides by washing the dejecta. They were then transferred to water on October 8th. The material was examined from time to time and it was not until the following April 14 that signs of development were noted. Three weeks later the embryos were seen in the shell. Later Davaine[2] showed that the embryos may remain alive in the shell for three years. Stiles and Gardner[3] have recently demonstrated that ascaris eggs are quite resistant to decomposition. In fæcal matter kept for four months (117 to 121 days), about eighty per cent of the ova appeared to be dead. Leuckart[4] proved that the ova can withstand desiccation, which, however, arrests the embryogenic process.

Thus, it is evident that the viability of Ascaris lumbricoides ova is not easily destroyed under the conditions usually met with in nature. It might therefore be supposed that the eggs would prove less susceptible to antiseptics than those of the other common intestinal parasites of man. With formaldehyde, at least, this is the case. An incomplete review of the literature on Ascaris lumbricoides has failed to reveal similar observations.

REFERENCES.

1. Davaine, C.: Recherches sur le développement et la propagation du trichocéphale de l'homme et de l'ascaride lumbricoïde. Compt. rend. Acad. d. sc., Par., 1858, XLVI, 1217.

2. Davaine, C.: Nouvelles recherches sur le développement et la propagation de l'ascaride lumbricoïde et du trichocéphale de l'homme. Compt. rend. Soc. de biol., Par., 1862, IV, 261.

3. Stiles, C. W. and Gardner, C. H.: Further Observations on the Disposal of Excreta. Pub. Health Rep., U. S. Pub. Health & Mar. Hosp. Serv., Wash., 1910, XXV, 1825.

4. Leuckart, R.: Die menschlichen Parasiten. Leipzig and Heidelberg, 1876, II, 210.

ANTERIOR POLIOMYELITIS—NOTE.

I

The Rockefeller Institute for Medical Research, of New York City, announces that it will devote its resources very largely during the present season to the study of anterior poliomyelitis (infantile paralysis) and to the treatment of acute cases of this disease in its hospital. Physicians and health officers desiring to co-operate in this investigation may do so by sending information concerning the occurrence and prevalence of this disease, or by referring acute cases to the Hospital of the Rockefeller Institute. Dr. Flexner renews his request of last year that whenever possible a portion of the spinal cord and of the naso-pharyngeal mucosa derived from fatal cases of the disease be sent to him. Specimens should be preserved in glycerin and sent by mail to Simon Flexner, M. D., 66th Street and Avenue A, New York City.

II

Anterior poliomyelitis* is, so far as known, a communicable disease, being communicated from one patient to another and also by means of a third person. It occurs in epidemics and tends to spread along the lines of greatest travel. There is reason to believe that it is prevented from spreading by quarantine, and with the very great prevalence of the disease in the summer of 1910 it is the opinion of this committee that it is essential that it should be made a reportable disease in all States in order that its presence may be detected and its spread guarded against.

Of particular significance are the so-called abortive cases, where indefinite ailments occur in children in communities where frank paralysis also exists. These abortive cases of infantile paralysis are undoubtedly a source of infection, and their record and study is of much importance. In a community where cases of infantile paralysis occur, cases of illness with sudden onset of fever and meningeal symptoms should be closely watched and regarded as possibly infectious. In such cases even recovery without paralysis does not establish the fact, that the case was not abortive infantile paralysis.

All cases of infantile paralysis should be strictly quarantined, sputum, urine and feces being disinfected, and the same rigid precautions being adopted as in scarlet fever. This quarantine should, in the opinion of the committee, last for four weeks in the absence of definite knowledge as to when the infection ends. Children from infected families should not be allowed to go to school until the quarantine is abandoned. The transportation or transfer of acute cases in public conveyances should be strictly forbidden. It would be very desirable to adopt provisional quarantine measures in suspicious cases in a community where an epidemic prevails. The report of all cases of infantile paralysis to the public health authorities should be enforced by law, and all deaths from this cause should be properly described and registered. A careful study of epidemics by public health authorities is strongly advised.

(Signed) Robert W. Lovett, M. D., *Chairman.*
Henry Koplik, M. D.,
H. Winnett Orr, M. D.,
Irving M. Snow, M. D., *Secretary.*

---

* Circular issued by the American Orthopedic Association and the American Pediatric Society in reference to acute epidemic poliomyelitis, and addressed to health authorities and boards of health.

OPEN AIR AND FOR OUTDOOR SLEEPING.*

By S. Adolphus Knopf, M. D.,

Professor of Phthisiotherapy at the New York Post-Graduate Medical School and Hospital.

Every physician interested in the treatment of tuberculosis nows how difficult it is to have anything in the line of addi-onal porches or verandas built onto a city home. First of l in cities, like New York for example, wooden constructions e not permitted. The vast majority of houses are tenement r apartment houses, and even if there should be space, the wner would not permit any addition.

My purpose to-day is to show to those who are so fortu-ate as to have their own house in city or town, or to have an ccommodating landlord, how they may avail themselves of very new and practical device which will answer all pur-oses for outdoor life by day and by night. I am indebted Mr. H. C. Ford, a young mechanical engineer, and to the tarnook Company, with which he is associated, for the con-uction of this device. As I have said, it is suitable for the t-cure in the open air by day and for outdoor sleeping by ht, and as the thought of the latter use came first, it has n called the "Starnook." This name is very appropriate , as will be seen from the following description, on a clear ht the stars can be seen from this little nook.

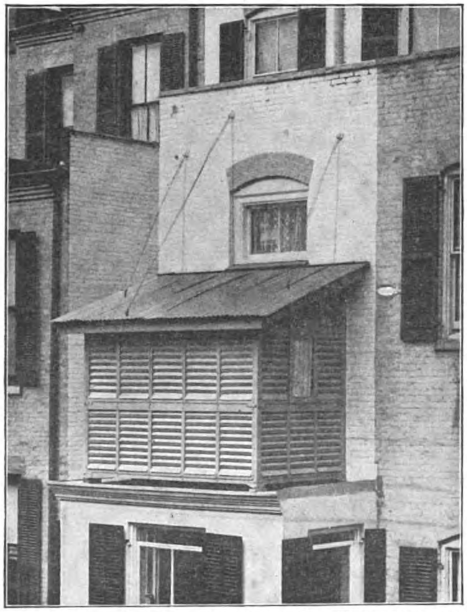


Fig. 1.—Starnook (Knopf Model) for the rest-cure in the pen air and for outdoor sleeping at night.

have slept in my starnook since October, 1910, and never e I had more peaceful nights, more sound and more refreshing sleep. To lie outstretched in the warm bed, breathing constantly the pure, fresh air, to be able to gaze at the beautiful sky, and watch the starry constellations without any effort, is a sensation which must be felt, for it cannot be described. I am inclined to believe that the most restless and nervous person will soon fall asleep in a quiet starnook. On bright, moonlight nights the scene is equally enchanting. Even on rainy nights with roof overhead and the slats of the shutters open to admit air, the sensation is a cozy one. One soon gets accustomed to the rain trickling on the roof and the monotonous noise of it is sleep inviting.

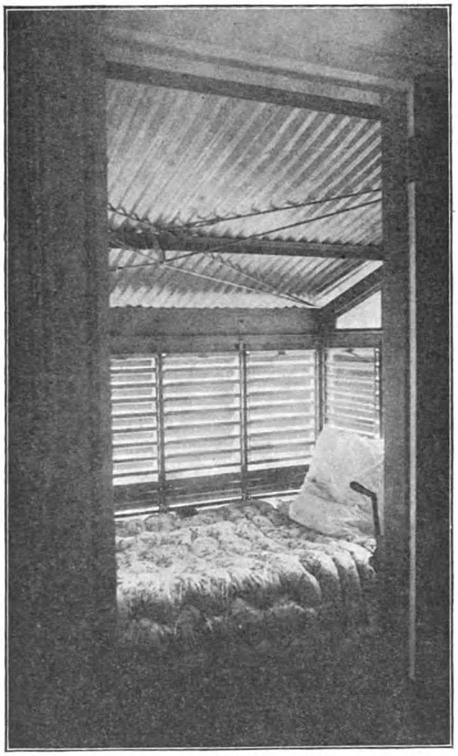


Fig. 2.—Interior of Starnook (Knopf Model) with windows, roof, and shutters closed. View from adjoining bathroom.

My purpose in having this starnook constructed was that it might serve as a model for tuberculous, pneumonic, or nervous patients who have been directed to live and sleep in the open air. As will be seen my own starnook (Fig. 1) is built on an extension at the rear of the house, but it could also rest on posts or columns, or triangular supports attached to the walls. The starnook consists of three walls composed of frames holding movable slats, of a roof and a floor. It is all made of galvanized iron with the exception of the floor, the

---

Abstract from a lecture on Aerotherapy, delivered at the ns Hopkins Medical School, Baltimore, March 27, 1911.

window sash and the roof-frame. The wall of the house closes the fourth side through which access is had to the starnook by a long window or a door. It is about 9 feet long, 6 feet deep, 6 feet high at the outer side, and 8 feet next to the house. It can also be made 8 feet deep and will then hold a bed and couch or two beds.

In either end is a glass window which can be opened outward, and Florentine glass fills the triangular spaces at each end under the slope of the roof, which rests a short distance above the walls to allow for free circulation of air at all times.

Figure 1 shows the starnook in use at night in rainy or stormy weather. Figure 2 gives an interior view, all closed except the door leading from the house into the starnook. On a clear night when there is no fear of rain or snow the roof of the starnook is raised by means of a crank and counterweights.

As seen in Figs. 3 and 4, the roof can be completely raised against the wall of the house and an unobscured view of the sky can be had by the occupant of the bed. During the day the starnook can be transformed into a typical rest-cure veranda. Three upper sections of the front shutters can be entirely opened, and with the two windows open and the roof up one is certainly out of doors. Figure 3 shows the starnook transformed from a night shelter to a pleasant resting porch by day time.

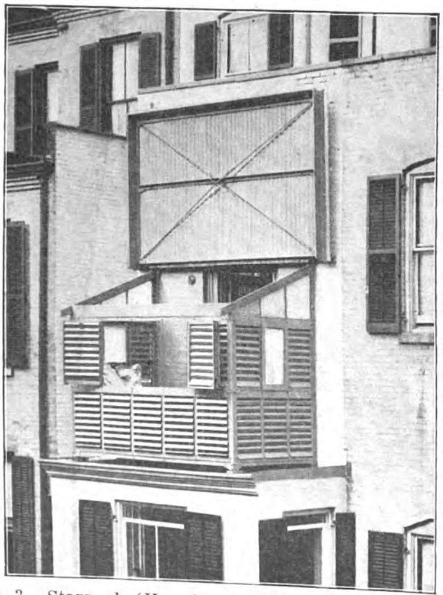


Fig. 3.—Starnook (Knopf Model) transformed from night-shelter to a pleasant rest-cure porch by day.

Figure 4 gives an idea of the interior aspect of the starnook by day with roof and all windows open.

The advantages of this device are manifold. When painted to match the house it forms an attractive addition. The slats that form the walls, instead of being straight, are bent inward at the lower edge and outward at the upper in such a way that when partly open they permit a free access of air, yet neither the bed nor the occupant of the bed can be seen by neighbors and absolute privacy is thus secured (Fig. 5).

In very stormy weather the shutters can be tightly closed (Fig. 6) to protect the occupant from rain, drifting snow and strong winds, and still there will be enough open spaces to allow the freest circulation of air. The lower sections of the shutters are manipulated simultaneously by means of a handle conveniently located so as to be reached from the bed. Each upper section has an individual handle whereby the slats can be placed at any angle desired. The handles are of wood so as not to chill the patient or occupant when he touches them in cold weather. An electric light which can be turned on and off with the aid of cords by the occupant of the bed, and a push button to call a maid or nurse in case of illness complete the arrangement for comfort.

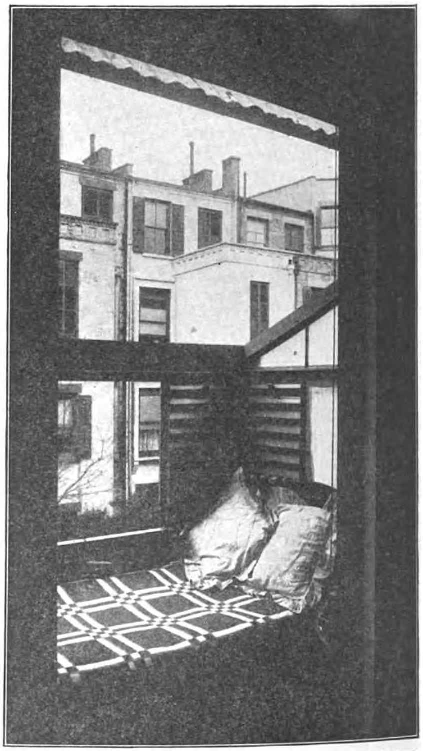


Fig. 4.—Interior of Starnook (Knopf Model) with windows, roof, and shutters open. View from adjoining bathroom.

Sometimes the starnook cannot be constructed so that the roof can be raised upward to rest against the wall of the house. If this is the case; then the roof has to be tilted outward. When for one reason or other it is desirable to have the construction on the roof of the house, a starnook can be constructed with a little shack, the two joined together so that the latter can be heated when serving as a dressing room. To make a good support for the roof of the starnook when raised, the shack would have to be somewhat higher. Another way is to divide the roof into two sections so that they may better

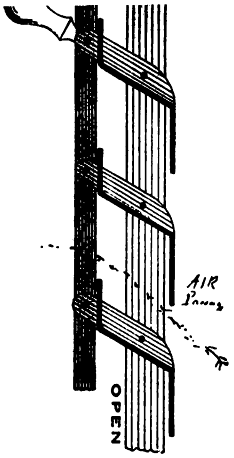


Fig. 5.

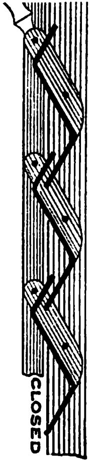


Fig. 6.

Fig. 5.—Diagram showing the mechanism of the movable iron slats.—Open.

Fig. 6.—Diagram showing the mechanism of the movable iron slats.—Closed.

or garden. If it is desired to have a double starnook, the two devices can be joined, the bathroom and dressing room being between them.

To the timid who are afraid of sudden rain showers or snow storms and believe that they cannot get the roof down quickly enough, or who fear to get out of the warm bed for the purpose of lowering the roof, there can be arranged an electric motor manipulating the raising and lowering of the roof quickly and securely, operated by means of a push button within easy reach from the bed.

It is hoped that with a demand for a number of starnooks, two different standard sizes can be put on the market at very reasonable prices. In presenting this new device to the profession and the public, the inventors trust to have been in a measure helpful not only in solving the problem of outdoor sleeping and outdoor resting for the tuberculous in cities, but also to have given opportunity to other sufferers to recuperate, and to the well and strong to enjoy constant fresh air, at least at night, and enable them to be more frequently in touch with nature than is granted to most city dwellers.

THE HAVEN OF HEALTH.*

A REVIEW.

By W. H. Bergtold, M. D., Denver, Colo.

In these days of wood-pulp paper and cheap bindings, it is refreshing to see and to possess a book which is venerable with age, so old that it is, as it were, a voice from the ancient dead. There is now such a book before us, and it will be used as a text for my portion of this evening's talks.

Let us read its title page, a photograph of which is here presented for your inspection (see p. 304); printed in 1636, the book harks back 274 years, and since it was written (1584) eleven generations have been born, have run the gamut of human efforts, hopes, desires, and sorrows, and have died. It seems a long time to me. Is it not of striking interest to us at this precise time and in this State, to see by the title page that nearly three hundred years ago a woman could run a printing establishment?

As a material object the volume has the additional attraction of exhibiting signs of the ravages of real book-worms.

How many of our present books will be found, 274 years from this day, in as good a condition as this old book? Very few, it is safe to predict.

The preface to this Haven of Health is inscribed 1584; such a date means but little to me unless I can orient myself by other chronologic marks. Perhaps some of you may have the same feeling, which will be excuse sufficient for me to try to fix this period in our minds by showing its relation to other dates and things. Elizabeth (1533-1603) was reigning in England when Coghan was writing, and he specifically mentions her on page 159. Shakespeare's span was from 1564 to 1616; this shows us that the great dramatist was a young man of but twenty when Dr. Coghan's dedicatory preface was finished. If we think of medical men of the immediately preceding, contemporaneous, and directly succeeding years, we realize that but a little while had elapsed since Servetus was burned at the stake, that Paracelsus had been dead less than fifty years, and that Van Helmont was but a child of seven at the issuance of the first edition. Only two years before, Galileo had discovered the principle of the pendulum, and before he had made his immortal discoveries of Jupiter's moons, this book had gone through at least two editions. Some renowned medical men were born about this time; Harvey six years after the book was written, and Willis and Sydenham shortly before it came out in the fourth edition.

When the book was chosen as a subject for to-night's paper, the speaker immediately wrote to the secretary of the Royal College of Physicians, England, for information concerning Coghan; here is the result of this correspondence:

Royal College of Physicians,
Pall Mall East. London, S. W., May 11, 1910.

Dear Sir:—

I send you herewith some particulars of Thomas Coghan, M. A., which have been gleaned from various sources, and have, so far as is possible, been verified. . . . .

Yours faithfully,
(Signed) W. Fleming.

W. H. Bergtold, Esq., M. D.

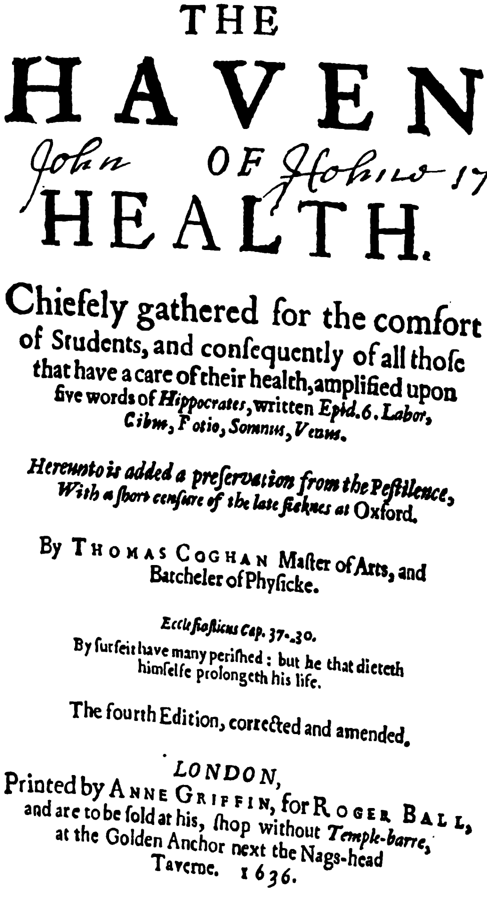
---

* Read before the Denver Medical History Club, January 6, 1911.

"Thomas Cogan, 1545-1607, physician, was born about 1545 at Chard, Somersetshire. He was educated at Oxford, graduated B. A., January 14, 1562-1563, M. A., July 5, 1566, and M. B., 1574. He became a Fellow of Oriel College in 1563, continuing until 1574. In 1574 he resigned his Fellowship and then (or in 1575) was appointed Master of the Manchester grammar school. He practiced as a physician at Manchester, taking a degree in that faculty in 1574. Before 1586 he married Ellen, daughter of Sir Edmund Trafford, and widow of Thomas Willott, who had property in Manchester. In 1591-3 he was the family physician of Sir Richard Shuttleworth. In 1595 he presented Galen's works, and other medical books, to the library of Oriel, where they are still preserved. He resigned the schoolmastership before 1602, died in June, 1607, and was buried on the 10th of that month in the Church of St. Anne's at Manchester. His will mentions property both in Somersetshire and in Manchester, and bequeaths books to all the Fellows and other officers of the college, and 4th, to each boy in the school. His widow died in 1611.

His works are:

1. The Well of Wisdome, containing Chiefe and Chosen Sayings Gathered out of the Five bookes of the Olde Testament . . . . 1577.
2. The Haven of Health, made for the Comfort of Students . . . 1584. (Several later editions.) With this was published "A Preservation from the Pestilence, with a short censure of the late sickness at Oxford," and several books in Latin intended as text-books.



THE
HAVEN
John OF [illegible] 1726
HEALTH.

Chiefely gathered for the comfort
of Students, and conſequently of all thoſe
that have a care of their health, amplified upon
five words of *Hippocrates*, written *Epid.6. Labor,*
Cibus, Potio, Somnus, Venus.

Hereunto is added a preſervation from the Peſtilence,
With a ſhort cenſure of the late ſicknes at Oxford.

By THOMAS COGHAN Maſter of Arts, and
Batcheler of Phyſicke.

Eccleſiaſticus Cap. 37. 30.
By ſurfeit have many periſhed: but he that dieteth
himſelfe prolongeth his life.

The fourth Edition, corrected and amended.

LONDON,
Printed by ANNE GRIFFIN, for ROGER BALL,
and are to be ſold at his, ſhop without *Temple-barre,*
at the Golden Anchor next the Nags-head
Taverne. 1636.

Wood, in his "Athenae Oxoniensis," from which most of the above notice has been taken by the writer of the article in the "Dictionary of National Biography," finishes with:

What other things he wrote I know not, nor anything else of him, only that he deceased at Manchester, in sixteen hundred and seven, and was buried in the Church there 10 June leaving behind him the character of an able physician, and Latinist, a good neighbor, and an honest man.

Through this information it becomes evident that Dr Coghan was a man of parts, estimated by the then existing standards; one notes, too, with surprise that he did not get his degree in medicine until he was 29 years old, which may be of some comfort to those who regret that a son is, in these days, so long in going through the academic and professional schools. It does no violence to historical evidence to assume that the practice of medicine in those days was just as keen a competitive game as it is now, and Coghan's taking up teaching with practicing lends support to this notion. You will note that his biographer describes him as an "able physician"; there is however, to me, an indefinable something in this book which gives me the impression that this man was not so much a real clinician as a student of medicine, a man who doubtless saw something of actual practice, but who wrote more from his book knowledge than from his bedside experience. This feeling has come to me between the lines of his book, as it were, notwithstanding that he clearly indicates that his book is intended as a guide to the preservation of health only, and the feeling may be wholly unwarranted.

Years ago in studying the birds mentioned by Shakespeare, the speaker gleaned a passing insight of the conditions of life in England during the period covered by the editions of this book; while the savagery of the times has doubtless been overdrawn, yet, softening it all we can, life then and there was far from gentle, and medicine was on a similar plane. We are apt to forget that there were no carpets, that dishes and forks were all but unknown at the table, and that slices of bread, called "trenchers," were served, to be used in place of plates. One gathers an inkling of these conditions, it seems to me, from various things in this book of "Health."

There was no such thing as sanitation, or hygiene; William Shakespeare, the poet's father, was fined, in 1552, twelve pence for not removing household dirt and refuse from his own door.

If one reads this book carefully and tries, even in a cursory way only, to follow some parallel and radiating lines of study suggested by it, one gains, it might be said, a liberal education. Let me hint at some things which aroused keen interest as the book was perused.

It is probably fair to assume that Coghan was as well educated as any average college man of his time; in effect it may be correct to feel that he was likely to have been better schooled than the majority of his classmates, since we find him teaching, and later, head master of a considerable school at Manchester. It is highly probable, then, that his pages reflect, tolerably well, contemporaneous knowledge, general and special. Hence one notes with interest the extremely divergent spelling in different parts of the book; it might be taken to signify that English spelling had not yet crystallized.

This bizarre spelling was considered by some in those days, it s said, to be "smart."

One stumbles in reading a word like "rise" for rice, 'rere" for rare, "limmes" for limbs, "todes" for toads, and o a botanist "cinckfoile" seems indeed odd. The obsolete vords look strange; "eftsoons" for soon is one. "Gisar of oule," while rather foreign in looks, becomes, after a little study, "gizzard of fowl." We meet with many words which look as though one ought to use them now; "misorder" in the following is one: "Wherefor it is better to preserve health by sobriety and temperance, than by surfit and *misorder.*" "Discommodities" for inconveniences and "dispraised" for discountenanced are two other examples. The modern verb "let" and its parts sound queer when used as a synonym for "hinder." Frequently one finds, in a single sentence, obsolete and living words of to-day, the latter however in a strange sense. Thus, in speaking of butter he writes: "Wherefore it is good for such as be commonly costive; and this experience I have of it, that some .... which eat no bread but *manchet,* by the eating of browne bread and butter in the morning fasting, (which is a Country mans breakfast), have beene made as *soluable* as if they had taken some purgation."

Vinegar made from ale is "aliger," while cider made from pears is "piery." "Oppilation" for constipation warns us that we would have to learn a new vocabulary if we were to converse with, and understand, our sixteenth-century *confrère,* on the value of cheese as a food.

We all know, through our reading along the lines of ethnology, that many living barbarous people consider the entrails of animals a great delicacy; the North American Indian has been described many times as eating the still warm small inestine of a freshly killed buffalo, deer, or steer, devouring it aw by the yard, as it were, deftly milking out its contents as a mere incident in the swallowing of the tid-bit. Coghan gives a hint of the survival in England, at least in a modified form, f a similar habit, when he discusses the uses of the inwards f beasts as food, calling the small intestine "chitterlings."

With us to-day there still remains some trace of this custom, or we still eat sausage, do we not?

The most interesting parts of his strange vocabulary are he words which seem surface indications of the distinct, but hen coalescing, linguistic streams, the Anglo-Saxon and the Norman, which have since flowed down the channel of time, merging as the English of to-day. Such indications are, for xample, "milt" for spleen, "reines" or "reynes" for kidneys; "mo" and "moe" for more are true middle English ords which make us think of the negro pronunciation of more. he possessive is formed in three ways, "Noah, his floud," oah's floud," and the "floud of Noah." While we have delved very briefly into this fascinating side issue, even this ttle takes us back to the plastic and formative period of our ngue, making us realize anew that the way has been long to is our day of condensed, yet amplified and exact, English. n addition to these indications of age, there are the words even more striking, to wit: "Whereas now through the providence of God, and the travaile of men, there is found further in the West, as it were a new world, a goodly countrey named *America,* or new India, for largeness, plenty, wholesome and temperate ayer, comparable with Affrike, Europe or Asia."

This old volume gives many examples which go to prove anew the truth that "history repeats itself"; the following quotation, with a little alteration, might well be taken for the warning recently ascribed to one of our captains of finance:

> And what commodity a good warraine of Conies bringeth toward the keeping of a good house, men of honour and worship that love hospitality doe well know. Which vertue being acceptable to God, and a singular benefit of all the country round about them (the more it is to bee lamented) is every day more and more neglected in England. The chiefe cause thereof (as wise men think) is wastefull and sumptuous apparell, now commonly used in every degree farre otherwise than *William Rufus* did, who being a kings sonne and the second king of this land after the conquest, was thought to exceed, when he bestowed a marke upon a paire of hose, using commonly to bestow but three shillings.

Likewise a loud complaint of this day had its counterpart three hundred years ago, a fact plainly seen when we read in the preface to the use of fish, remarks as follows: "This much of flesh. Now concerning fish which is no small part of our sustenance in this Realme of England. And that flesh might be more plentifull and better cheap, two days in the weeke, that is Friday and Saturday, are especially appointed to fish." We can join hands with our professional brother of three hundred years ago, and lament with him over the price of meat.

One can well believe that the drift of human conduct has not changed much in all these years, when one finds that Coghan waxes warm over those obstinate people who will not avoid infection, on the ground that one will have a disease sooner or later, and it might as well be first as last.

The book shows strikingly how deeply rooted in the past are some common customs of to-day, little things which are so trivial that no one thinks of them in any way but as things of the moment. We all know how often one is told to smell of bread if one tends to sneeze on smelling mustard. The same advice is in this book. And so is the advice to toast cheese before putting it in a trap, the better to entice rats.

The same vanities were then as now, for we find Dr. Coghan remarking on the custom of young girls drinking vinegar to make the complexion pale.

"Cummin seeds sodden in water, if the face be washed with the same, doe cause the face to be clearer and fairer," all of which shows that women, perhaps men too, had an eye to complexions, and were wont to consult a favorite physician on such important matters.

Familiar stories and jokes appear, even in this medical book; the drunkard's wish for a giraffe's throat bobs up, only it is a crane's gullet that is desired this time; and the ostrich story is at hand, but it is the mullet which hides its head when Coghan tells the tale.

As one reads, one finds two particular vanities cropping out, one a national and one an ethnic; Coghan thought, as do many Englishmen to-day, that his country was superior to all others, and there are many expressions in his writings which, through him, exhibit the ethnic belief that man is of different clay from the brute.

Dr. Coghan's long experience as a teacher seems to have fixed in his mind many definite ideas concerning students; they were not a very robust lot and were bothered more or less with weak digestions. He seems to think he knows why so many students fail to achieve success: "The excess of wine is the cause . . . . why few young men that bee students, come to profound knowledge and ripenesse in these days"; and to avoid such a harrowing possibility, the following advice is written: "But I advise all students, such as bee students *nomine et re,* because they have commonly feeble braines, if not by nature, yet through study, to refraine from strong wines, because they distemper the braine, and cause drunkennesse ere a man bee ware." Our worthy author may have been no novice in Bacchus, for he says that cold water hinders digestion because it "cooleth the stomach overmuch. . . . The like effect it hath . . . . . when thirst happeneth after drinking of much wine." One might imagine this candid old practitioner comparing notes with Eugene Field when they met in the Beyond, for Field's verses on the Clink of the Ice in the Pitcher would surely appeal to him. "Katzenjammer" was evidently not an unheard-of thing in Coghan's days.

The book has running through it a vein of piety, which, it seems to me, is quite genuine; notwithstanding this attitude towards things religious, our author does not hesitate to pay his respects to clergymen and priests, in a way which was perhaps not to their liking.

> **Because of good Wine, more than of any other drink, are engendered and multiplied subtile spirits, clean and pure. And this is the cause (saith hee) why the divines that imagine and study upon high and subtile matters, love to drink good wine.**

Assuming that there was no other information available, would this old tome help to throw light on the natural history of England as it was in those days? Indeed it would; it tells us that the wild ox (the present Chillingham Park cattle) and the wild boar still roamed in England; in fact, we can assume that both were common enough to be considered as possible sources of food; we should also learn that deer, hare and rabbits were frequently used as food, though it might bother us a bit to determine what a "conie" was, did not the author use the word synonymously with rabbit. We should learn, too, that paleölithic man's habit of breaking the long bones to extract the marrow had survived to Coghan's time, since we find him writing of the uses of bone marrow as food; by the same page we learn that he did not wholly differentiate between the long bone marrow and the spinal cord, for he says that the "marrow that cometh downe the backe bone is of like nature to the braine."

One of man's most anciently rooted beliefs comes to light again in this volume: An enemy's courage is in his heart, eat his heart and acquire his courage. It is but a step to apply this doctrine to the different organs of animals and the fu tions of such organs.

"The stones and udders of beastes being well digested nourish much, but the stones are better with their moyst the udders cold and flegmaticke, they both doe increase see generation." Thus is added one more to the already long of those who anticipated Brown-Sequard by generations.

Coghan's list of birds, included in the chapters on fo was of especial interest to me, and a very instructive one from it we learn that he and his contemporaries knew of, a used as food, "Fesaunt, Partrich, Wood Cock, Pigeons, T tle Doves, Queales." We see moreover, that this schoolmas physician believed that "Queales" furnished the meat rai by Jehovah for the Israelites while they wandered upon desert. We also find that in England, small birds, such sparrows, were employed for food, as they are to-day southern and middle Europe, *i. e.*, starlings, blackbir lapwings, moor hens, wagtails, robin red-breast, larks. are birds which most of us nowadays would not only scorn touch as food, unless driven to it by dire distress, but we feel a pity that such useful and genial species should be kill to so little purpose; many game birds are included in Coghan list, such as geese, swan, mallard, teal, shoveller, wige plover, and so also many which are quite beyond the pale civilized beings—herons, cranes, "buttorns" (bitterns). exotic species, long acclimatized, in England, the peacock, a another, introduced surely not more than half a century fore the Haven of Health was written, the turkey, are mentioned. No one can tell whether Coghan was persona familiar with all the birds in this ample list, or not; we see, however, that in some respects his ornithology was much worse than that of White of Selbourne fame, for the latter believed that swallows hibernated in swamp mud duri each winter, while the former had a most fantastic concepti of the zoölogic relations of the puffin. Let him tell us ab this bird: "There is also a kind of fish called a Pu which in respect that it liveth altogether in the water, ma accounted a fish; whereas otherwise considering that it feathered and doth flie, as other foules doe, it may seeme to b flesh, except that you would account it as a Syren, or merma den, that is halfe fish and halfe flesh." Perhaps this was book knowledge. Who knows?

That England, an island, and a maritime nation, utilized to the utmost its fresh-water, littoral, and deep-sea fishes, a knew them well, is abundantly attested by the list of fish given in this book. In this list of thirty-nine fishes, the are many which I never heard of, and many others known me by name only. In addition to this notable list one mu add oysters, mussels, shrimps, crabs, lobsters and cockles.

The plants given for foods and medicines make a lo enumeration, there being over one hundred, not counting the plant products, fruits, nuts and spices. These various veg- tables, fruits, and condiments would betoken, inferentially, a considerable degree of luxury, yet outside of quite circumscribed city and castle circles, all was rough, rude, an ors, the prototype of our Western barbecue. Negative evi- nce is frequently as interesting as positive; in this long t of vegetable products, compiled and elaborated with evi- nt care, no mention at all is made of the now almost cos- politan American products, the potato and Indian corn, obably because then they were only becoming known.

From a medical point of view the key to the whole book is e quotation on the title page; though much of the context the various chapters may seem silly to us, there still runs rough all of the fabric woven by Coghan, a warp of admir- le instruction as to diet, drink, and other factors in the eservation of health. In his descriptions of the cooking of ds he shows that the primitive custom of cooking meats d vegetables in earthen vessels still held in England. As e reads his directions about various articles of diet, unex- cted facts come to light. It appears that violets were then d as spinach is to-day; one is surprised to find that he ms to have, though something of a *bon vivant* himself, a opinion of bacon; this may have been because the finished duct then was far from what it is to-day.

Astrologic lore crops out when he writes under the caption "cibus": "Shell fishes be at the best when the moon in- aseth as the Poet Horace noteth."

That customs are tenacious of existence, notwithstanding it they be transported across wide seas, and through spaces time, is shown by the use then, and now, of rice, milk, and namon, all mixed together.

Dr. Coghan's experience made it clear to him that different lividuals are suited each to his own kind of exercise or or. He also carefully differentiated between exercises use- for different parts of the body. Thus he especially com- nds "tenis," perhaps because Galen had done so, or had at st recommended a game that Coghan called "tenis," and ich may have been like modern hand ball.

The extended division on "cibus" is a forceful reminder, parts at least, that dietetic wisdom did not begin with us l our experimental laboratories. Let us read what Coghan s about the quantity one should eat: "That it be according the nature of him that eateth, and not always according appetite. For the temperate stomacke only (which is to bee found) desireth so much as it may conveniently st. Contrariewise the hot stomacke doth not desire so h as it may digest. The cold stomacke may not digest so h as it desireth. Wherefore, the surest way in feeding, leave with an appetite, according to the old saying, and eep a corner for a friend." Surely there is wisdom and l advice in this, even though the same may have been said y times before, and since.

several places there is expressed a decided preference fowl, domestic or wild. He sings the praises of aunt" this way: "Fesaunt exceedeth all foules in sweet- and wholesomeness, and is equall to a Capon in nourish- but is somewhat dryer, and is of some men put in a meane een a henne and a partrich. It is a meate for Princes

it.

His classification of diets, you will surely agree with me, is not without humor:

> Full diet is much enough,
> Mean diet is enough in a mean,
> Slender diet is little enough.

There must have run a streak of the epicure through this physician, for he waxes warm over the praises of a good cook and good cooking; "A good cooke is a good jewel and to be made much of, *modo fit vir bonus*," and this is exemplified again when he writes, "because cookery is part of physicke and a good cooke (as Dr. Broad saith) is halfe a physitian."

When Coghan advises "Poor Schollers" that "Great suppers and late suppers must bee banished from all healthful houses," mayhap he had companies like this in mind. If by chance we eat too much despite his advice, we can find consolation and a present relief in his suggestion that "if thou feel that thou hast eaten too much, arise, goe thy way, cast it out of thy stomacke, and take thy rest, and it shall ease thee, so that thou shalt bring no sickness into thy body."

Last fall a cowboy said to me as I was on a cattle drive, "I believe it does a man good to get drunk once in a while, say once a month," a notion much older than I, at the time, realized, for it is fully amplified in this book, when it says: "Yet I read in *Arnoldus* upon *Schola Sal.* that surfetting and drunkenness is sometimes expedient, because thereby we fall to vomit, whereof ensueth cleansing of the stomacke, and preventing of many ill diseases of long continuance." This notion is not, however, to the satisfaction and approval of Coghan, who once more shows sound sense in matters dietetic when he quotes, with approval, his admired medical forebears:

> But to procure vomit, through excessee and drunkenness, as it is ungodly, so it is beastly; and doth more hurt the stomacke, the braine, the brest, and all parts of the body, than it doth profit. . . . . . .

Much as he seemed to have valued wine in moderation and to have condemned it in excess, his opinion of a total abstainer is unique, which I will read to you: "And this is the cause (as I thinke) why men by nature so greedily covet wine; except some od *Abstemius*, one amonge a thousand perchance degenerate, and is of a doggish nature, for dogges of nature doe abhorre wine."

Mingled with his directions how to drink, and how to choose strong drinks, are indications of his notions of physiology, and theories of disease. Thus he says:

> That is to say we ought to drink moderately, so that the stomacke be not hurt thereby, nor drunkennesse caused; for much abundence of drink at meales drowneth the meat eaten, and not onely letteth convenient concoction in the stomacke, but also causeth it to pass faster than nature requireth, and therefore engendreth much flegme, and consequently rheumes, and crudenesse in the veines, debility, and slipperinnesse of the stomacke, continuall flux, and many other inconveniences to the body, and members.

There are many curious sayings in his discourse on milk, which would be of keen interest if read *in extenso;* but we will have to content ourselves with an excerpt or two. Milk, according to him, is blood twice concocted, and it is of great use for "them that bee wasted, or in a consumption, or be leane." For woman's milk he has the highest praise only: "Yet common experience proveth that womans milke sucked from the breast is without comparison best of all in a consumption. Wherof a notable example was shewed of late yeares in the old Earle of Cumberland, who being brought to utter weakeness by a consuming Fever, by means of a womans sucke together with the good counsaile of learned Physitians, so recovered his strength, that before being destitute of heires male of his owne body, he gate that most worthy gentleman that now is inheritour both of his fathers vertues and honour."

While Coghan gives extended space and much attention to strong drinks, and is decidedly not a total abstainer, he also is loud in his praises of water as a beverage; passing over all of this, though it be of real interest, let us read what his tests of a good water are: "First by the lightnesse, for the lightest is best. Secondly by little skim or froth in boyling. Thirdly by drenching of linnen clothes in the water, and laying the same to dry, for that which is soonest dry, sheweth the best water."

This being a modest and polite gathering, and the reader a bashful man, the chapter on Venus will have to be passed over most hastily; Coghan's humor comes to the surface in it, more than in any other one in the book. To digress a moment I may say that in speaking of fishes, he plays on words, and says, "And the tongue of a carp is very pleasant to carping Ladies." Likewise under the head of trout he is again facetious. "This fish by nature loveth flattery; for being in the water it will suffer itselfe to bee rubbed and clawed, and so to bee taken. Whose example I would wish no maides to follow, lest they repent after claps."

One reads with amusement the following disapproval of early marriages:

> that the woman at twelve yeares of age, and the man at fourteene, are marriageable, which thing is the cause that men and women in these dayes, are both weake of body, and small of stature; yea in respect of those that lived but forty years agoe in this land; much more then in comparison of the ancient inhabitants of *Britaine*, who for their tallnesse of stature were called *Gyants.*

The extraordinary sexual capacity of the house sparrow of England must long have been current knowledge in that period, for Shakespeare speaks of it in his plays, and Coghan mentions it in these words:

> And this is the cause why such as use immoderate *Venus* be short lived, and as the Sparrowes, through incontinency, consume themselves.

Along a similar line of thought he cautions against the use of sparrows as food because "they stirre up Venus, especially the Cocke sparrow." Having shown that there are dangers in worshiping too devotedly at the shrine of Venus, he also r marks on the evil effects of being continent.

Perhaps it will be useful to this meeting to learn how abate carnal lust:

> Last of all to conclude these meanes whereby to abate carn lust, I will recite certaine examples gathered out of our Engl Chronicles of some men in time past, who supposed all chas to consist in single life. *Elphlegus*, Bishop of Winchester, p upon him *Duntanes* a Monkes apparell, that hee might ther avoid both the fire of concupiscence and the fire of hell. *Petrock* an hermit of Cornewall, was faine every night from th crowing of the cock to the spring of the morning to stand nak in a pit of water to abate the movings of his flesh, yet could h never have remedy of that disease, untill he went on pilgrima to Rome and Ierusalem. *S. Aldelme* Abbot and Bishop of Mal bury, when hee was stirred by his ghostly enemy to the sinne o the body, would hold within his bed by him a faire maiden s long time as hee might say over the whole Psalter, to the inte to doe the more torment to himselfe and his flesh. These me (as you see) as holy as they seemed, were yet captives to Cup and could hardly get loosed out of his bands, or whether th were loosed at all, it may be doubted. . . .

His views, on the other hand, of the beneficial results of e ercising this primal function are not without interest: "F it procureth appetite to meate, and helpeth concoction, maketh the body more light, and nimble, it openeth the po and conduits, and purgeth flegme, it quickneth the min stirreth up the wit, reviveth the senses, driveth away sadnes madnesse, anger, melancholy, fury."

It is touching to witness the extreme solicitude this g old chap had for his students and scholars. Thus he sa that to abate concupiscence the best, in his judgment, "is f a man to keep himself out of the company of women."

One naturally asks, while and after reading this book, wh sort of a physician this man was. We have seen, through th quotation from his biography, that he was esteemed a g physician. Can we find evidence of this in his writings? O cannot be very critical in this attempt, for the avowed purp of the book in hand, clearly put forth in many places, is al the lines of prophylaxis, and hence it can hardly be expecte show the writer's merits as a clinician.

There was, in Coghan's time, really no science of any s much less any systematized knowledge of medicine whi under the most liberal construction, could be called a scien of medicine. While the germs of our so-called present-da science of medicine were developing at that time, there ha been little or no advance to speak of in the study of medicin especially in anatomy and physiology, from the third centu on to about the time of Coghan's life. He was clearly a f lower of Galen, in so far as one can judge from his therape tics; he used simples, and mentions nowhere in his discour any inorganic as a medicine, though he knew of Paracels specifically mentioning him on page 180, and presumab knew of his views and of his strong predilection towards sa and other chemical agents. Moreover we can feel furth confident of his admiration of, and faith in, Galen, since quotes the latter most extensively; he also quotes numer other older medical writers, being familiar with such parts ve thought of the teachings of his own immediate medical edecessors, and contemporaries, we can be sure that he was t misled by the false notion that drugs were a *sine qua n,* though some words of his would imply that he did think edicine was indispensable; he had, unquestionably, great ith in the medical art of his day, but he also clearly disrned that there is such a thing as the *vis medicatrix naturæ.* is book shows in itself, and in its thesis, his appreciation of e surpassing importance of prophylaxis, a thing redounding ry much to his credit, when we consider the state of medical owledge at his period. If, before reading the Haven of ealth, one had forgotten all about the humoral theory as exunded by Hippocratic physicians and the temperament eory as held by followers of Galen, he would soon be rended of these ancient beliefs, by page after page of Coghan's itings. There is, however, less of the humoral theory in the ok than of Galen's theory of temperament. Almost everyere one finds that Coghan, in describing foods, carefully es the degree of heat or cold, and of moist or dry. "Malves are hot and moist in the first degree," whereas caraway s hot and drie in almost the third degree."

' Concoction " was a well-worn word with him as it was with ny of his contemporaries and successors. What we should was digested he says is "concocted," and as we have aldy seen, his conception of the secretion of milk has to be pressed by the same word; that is, "milk is made of bloud ice concocted." His knowledge of the character of different ts of certain foods was hazy, and naturally often incorrect. r example he mistook the thermo-coagulable albuminoid of lk for a second kind of cream.

What we term physiology was with him non-existent; neverless he tries to explain numerous different physiological cesses. On page 279 we have the following example, to :

> ow to enter more deepely into the nature of mankinde . . . shall understand, that as every living creature doth feed, and he meat received is altered and changed three times, that is ay, in the stomacke, liver, and parts before it nourish the , and as every concoction hath his superfluity, or excrement, he stomacke ordure, the liver urine, the veines sweate.

'his may sound strange, yet it is simple when compared his explanation of sleep: "for here is shewed by what nes sleepe is caused. That is, by vapours and fumes rising the stomacke to the head, where through coldnesse of the ne, they being congealed, do stop the conduits and wayes he senses, and so procure sleepe."

he book has many suggestions commanding wholesome ret, advice of help through all time; listen to this: "Man s to live, and liveth not to feed. Yet a reasonable time at in is necessary, for to eat overgreedily, and to snatch ur meat hastily, is hurtfull, and hindereth concoction; and iew our meat well and to swallow it downe leisurely, is a t furtherance to the well digesting of the same. And in-

The following quotation will give some inkling of his beliefs about the digestion of meat, and, too, how the Galenic terms of heat or cold, moist or dry, were applied: "But here in England where we feed on divers sorts of meates at one meale, the order commonly is thus; that first we eate pottage or brothes, then boyled meates, after that rosted or baked, and in the end cheese and fruits. . . . And next I say, that for as much as our stomacks in England most commonly be hot and cholericke, that grosse meats be most convenient to be eaten first."

We to-day eat cheese with pie, because it is a convention; this convention probably arose because of the notion that cheese aided in the digestion of pie, and perhaps it is a direct descendant of the belief expressed by Dr. Coghan when he says: "First it [cheese] strengtheneth a weake stomacke. Secondly it maketh other meates to descend into the chief place of digestion, that is the bosom of the stomacke . . . . ."

It is rather difficult to estimate how much he realized the truth of his remarks when he warns against the use of fish taken from muddy waters, and advises the use of fire to destroy contagion. In the brief outline on how to avoid the plague there is much wisdom, and the same may be said of his directions how to avoid gout. Here and there in the book one glimpses a dim conception of immunity: "for they that come out of a pure aire into a corrupt ayre, are in greater danger than they that never fled away."

There is only one attempt in the whole book to describe a disease, a description which, seemingly, gives a picture of an epidemic of typhoid fever occurring in 1522, this date making his description probably a second-hand one.

It is curious how clearly two very divergent strains run through his medical ideas; he is very sound about diet, exercise, moderation, etc., and on the other hand many of his conceptions of therapeutics are ludicrous; perhaps because he could not analyze and separate the effects of drugs, and could check up the good results of proper diet, and exercise; and in all this he probably did not wholly realize how much physicians are aided by nature. Of his mistaken ideas, we may mention his feeling that yellow jaundice and worms are dangerous without medicine, and that a pleurisy is present death "without blood letting."

Many of our contemporaries believe, as he did, in the successful solvent treatment of renal and vesical stone. Perhaps there is truth in this; certainly there seems to be truth in his theory that certain kinds of food predispose to, and promote the formation of, calculi.

Any undue credulity he may have exhibited is excusable, for he lived when there was little or no tendency to study cause and effect; when Coghan writes that sage is of use "because it is good against pleurisies, and comforteth the sinews and Braine, it must needs bee for Students, who are commonly cumbered with diseases of the head," and that hare's brain is good for "shaking of the limmes, which is called Palsie," one must not feel that he is to be classed with the thin-witted people who built theories of dilutions and potentizations, and their wonderful effects. He was simply repeating the errors which were a heritage from an even more credulous ancestry. We must overlook this, and give him credit for the many sound bits of advice he deals out in this book.

Let us see what kind of a prescription he writes, if what is here given may be called a prescription; these are the directions for making "*aqua composita*":

> Take of Sage, Hisop, Rosemary, Mint, Spike, or Lavender leaves, Maierom, Bay leaves, of each like much, of all foure good handfulls, to one gallon of liquor. Take also of Cloves, Mace, Nutmegs, Ginger, Cinamome, Pepper, Graynes, of each a quarter of an ounce, Liquorise and Anise, of each halfe a pound: beate the spices grosse, and first wash the herbs, then break them gently betweene your hands. Use the Liquorise and Anise as said in *Aqua vitæ*, then put all together into a Galon or more of good Ale or Wine, and let them steep all night close covered in some vessell of Earth or Wood, and the next morning after distill them as you doe *Aqua vitæ*.

We look in vain through this work for indubitable evidences of a belief in, or use of, charms and kindred relics of barbaric medicine; there are several passages which imply a belief in astrology, though all of this may have been included on the authority of his predecessors, which would not necessarily carry with it his own personal approbation. As an example of undue faith we may instance his apparent approval of Dr. Steven's Water, a decoction of wine, ginger, galingale, canel, cinamom, nutmeg, greyns, cloves, mace, annis, fenel, caraway, sage, mint, red roses, time, pelletory of the wall, wild maierom, rosemary, wild time, camamel, lavender and avens, all distilled in a "Limbecke" and useful because "It comforteth the spirits, and preserveth greatly the youth of man & helpeth inward diseases comming of cold, against shaking of the palfery, it cureth the contraction of sinews, and helpeth the conception of women that be barren, it killeth worms in the belly, it helpeth the cold gout, it helpeth the tooth ach, it comforteth the stomacke very much, it cureth the cold dropsie, it helpeth the stone in the bladder, and reynes of the backe, it cureth the canker, it helpeth shortly a stinking breath, and who so useth this water now & then, but not too often, it preserveth him in good liking, & shal make one seeme young very long."

There are also hints that there then existed in England relics of very ancient savage medicinal agents; Coghan speaks of the use of the "lungs of fox, pulverized for preserving the lungs," and of an "electury" which he calls "Loche de Pulmon Vulpis"; in an analogous class is a famous remedy long used by orientals, called "Triacle," a compound made under conditions of great mystery and ceremony, and containing, besides many other ingredients, portions of vipers. If one can believe what Coghan said about this remedy, it must have been a boon to suffering humanity. "Yet this much I dare say by the authority of Galen . . . . that no one medicine is better, either to preserve from the plague, or to expell the venome the principall parts in such as be infected, than Triacle, and is not onely good in the plague, but also in all other poysons, and noysome drinks; yea, and in most parts of other diseases, as the Cough, the Cholicke, the Stone, the Palsie, [illegible] Jaundice, the Ague, the Dropsie, the Leprosie, the H[illegible] ache . . . . ."

It would be most unfair to look upon this side of the [illegible] only; if he believed such things, and we cannot be sur[illegible] did, nevertheless they did not preclude his having fait[illegible] things of manifest helpfulness. He advised the use of [illegible] drinks for fever, which places him far in advance of [illegible] medical men who practiced only sixty years ago. He [illegible] clearly recognised the very important fact that abstin[illegible] from food was indicated in some diseases, for he writ[illegible] "Yet in sickness sometimes a slender diet is necessary, [illegible]cially in *Morbus acutis*"; and he knew that depletion [illegible] be had in several ways. Fasting "is next in force to [illegible] letting."

The chapter on the plague ought to give us some mea[illegible] as to his abilities as a clinician, but it must be confessed [illegible] it reveals little; we can certainly agree with his advice [illegible] plague patients should consult, and secure the aid of, lear[illegible] physicians and surgeons.

Coghan believed thoroughly in the infectivity of pla[illegible] through personal channels or fomites, and in the wisdom [illegible] avoiding all avenues of infection; there are signs in his w[illegible]ings that he had a more or less clear conception of the [illegible] that there were differing degrees of infectivity.

What shall be said of the book now that it is read? I[illegible] surely genuine in its efforts to give good advice, and adv[illegible] only along the lines put forth in the thesis as being for "[illegible] those that have a care of their health," while the gener[illegible] credits in the text show a total lack of pretentious claims [illegible] things not his own.

As for the man, one can say that he creeps into one's a[illegible]tions, an honest, clean and God-fearing figure, endowed w[illegible] something of the seer in that he felt the predominant [illegible]portance of prophylaxis, and the value of health.

Without any other characteristics, he would be notable b[illegible]yond his time and generation in that he clearly recognis[illegible] that every man is a law unto himself:

> So I say, notwithstanding that every rule prescribed in [illegible] booke cannot agree with every mans complection, yet the r[illegible] are not to bee disallowed, but to bee followed accordingl[illegible] every man shall finde them good and wholesome in himsel[illegible] And this is the best Physicke of all for every man, to [illegible] thoroughly the state of his own body, and to mark dilige[illegible] what things are wont to doe him good or harme.

THE JOHNS HOPKINS HOSPITAL BULLETIN.

The Hospital Bulletin contains details of hospital and disp[illegible]sary practice, abstracts of papers read, and other proceedings [illegible] the Medical Society of the Hospital, reports of lectures, and oth[illegible] matters of general interest in connection with the work of [illegible] Hospital. It is issued monthly.

Volume XXII is in progress. The subscription price is $2.0[illegible] year in the United States, Canada, and Mexico; foreign subs[illegible]tions $2.50.

tord Afield. By Medicus Peregrinus. Price, 50 cents. (*Boston: W. M. Leonard, 1911.*)

A small paper bound volume of letters sent to the Boston Medi- l and Surgical Journal, by one of its editors, while traveling in ıgland and on the Continent. He writes of things medical as ıll as of objects with other interests, and a pleasant half hour n be spent, when one is tired of serious reading and hard think- g, in glancing through these views of foreign countries with eir various attractions.

Treatise on Diagnostic Methods of Examination. By Prof. Dr. Hermann Sahli, Director of the Medical Clinic, University of Bern. Edited, with additions, by Nathaniel Bowditch Potter, M. D., Asst. Professor of Clinical Medicine, College of Physicians and Surgeons, New York. Illustrated. Price, $6.50. (*Philadelphia and London: W. B. Saunders Company, 1911.*)

The admirable work, first reviewed in the Bulletin, April, 1907, w appears in an enlarged form, improved by the careful editing the author. This edition is a translation of the fifth German ltion, and is therefore fully up to date, and most valuable for students.

ite Board Questions and Answers. By R. Max Goepp, M. D., Professor of Clinical Medicine at the Philadelphia Polyclinic. Second Edition Revised. Price, $4.00. (*Philadelphia and London: W. B. Saunders Company, 1911.*)

uestions on serum and vaccine therapy, serum diagnosis and ıtment of syphilis, chemotherapy, diseases due to intestinal asites and other tropical disorders, the new heart-physiology, myogenic theory and the graphic methods of studying the nomena of the circulation have been added to this edition. en it first appeared, the book was reviewed in our issue of ;ust, 1908. Except for these new additions the work practically ains as it did then.

Principles and Practice of Modern Otology. By John F. Barnhill, M. D., Professor of Otology, Laryngology and Rhinology, Indiana University School of Medicine, and Ernest de W. Wales, B. S., M. D., Clinical Professor of Otology, Laryngology and Rhinology, Indiana University School of Medicine. Second edition revised. Illustrated. Price $5.50. (*Philadelphia and London: W. B. Saunders Company, 1911.*)

ıe merits of this book were commented upon in this journal [ay, 1908, its first-class illustrations and "the attention paid l the little details of clinical study and care of cases." The edition differs only slightly from the first—some chapters been rewritten or revised, and with a few additions the has been made useful by being brought up to date.

ınual of Physical Diagnosis. By Breffney Rolph O'Reilly, M. D., C. M. Demonstrator in Clinical Medicine and in Pathology, University of Toronto, etc. Illustrated. Price $2. (*Philadelphia: P. Blakiston's Son & Co., 1911.*)

the medical student about to enter upon his duties as clinical in the hospital ward and to the general practitioner who ecome "a little rusty" in the methods employed in diag- of a medical case, Dr. O'Reilly's "Manual of Physical ıosis" will prove of considerable value.

ile numerous books along similar lines have recently ap- d, there are several features which make this little book ıch practical value.

;inning with a chapter devoted to the taking of a clinical history the author treats in chronological order the methods employed in the actual examination of a patient. Under "general inspection," we find first noted that which is, as a rule, almost too obvious to mention and for that reason, often overlooked, a careful discussion and tabulation of the various gaits and facies exhibited by the patient.

Special inspection is given to the skin, head and extremities. According to the findings on inspection, palpation, percussion and auscultation each system, respiratory, circulatory and digestive are carefully reviewed.

The chapter devoted to the circulatory system has considerable space given to the instrumental methods of examination and contains much of the newer light thrown on the study of the heart by Dr. James Mackenzie, and also reproductions of his excellent cardiograms. The latter half of the manual is devoted to a fairly comprehensive outline of the ordinary laboratory technique which one needs to use in the examination of a medical case.

J. S. B.

The Racial Anatomy of the Philippine Islanders, Introducing New Methods of Anthropology and Showing their Application to the Filipinos with a Classification of Human Ears and a Scheme for the Heredity of Anatomical Characters in Man. By Robert Bennett Bean, B. S., M. D., Associate Professor of Anatomy, the Tulane University of Louisiana. With nineteen illustrations reproduced from original photographs and seven figures. (*Philadelphia and London: J. B. Lippincott Company, 1910.*)

The Racial Anatomy of the Philippine Islands is the outcome of studies in anatomy begun in the Medical Department of the Johns Hopkins University some years ago which have been continued since wherever the author has found material to study, mostly in the Philippines. In his examination of more than 4000 persons during this investigation he has sought for definite types which, in his judgment, will justify him in distinguishing different races by their anatomical pecularities. These types are recognizable by ear form, cephalic index, nasal index and other factors so that they can be studied by families through several generations in order to establish their hereditary characteristics. He finds two predominant types of races in the Philippines, the "Iberian," which seems to have originated from a mixture of the Spanish, and the native races which he terms the "Primitive." From these, giving rise to a race like the Eurasian in India, by various mixtures and environmental conditions, such as climate, soil and altitude, the author gets a variety of races to which he applies varying names like "Modified Primitive," "Australoid," "Alpine," "B. B. B." (Big-cerebellumed, box-headed Bavarian), "Adriatic," "Cro-Magnon" and Blends—the "B. B. B." and "Cro-Magnon" resembling the Iberian, and the "Alpine" and "Adriatic" resembling the Primitive. The volume contains an account of the author's study of these races in the Philippines in order to determine the proportions which exist in various portions of the Archipelago. We find many interesting details respecting the Benguet, Lepanto and Bontoc Igorots, the criminals and outcasts at Manila, the men and women of Laytay and the men of Cainta. The work of classifying these diverse elements has been done with great care and industry and the author deserves all praise. It seems probable that farther study and larger observations will be required to determine how practical this new method of anthropological study may prove. Its methods are painstaking, thorough and accurate. It is a source of regret to all interested in the subject that ill-health required the author to relinquish his studies in Manila.

The chapter entitled "The Relation of Morphology to Disease" is of extreme interest because of the relation of race form to disease incidence. Thus, at the Malecon morgue, 70 per cent of the Iberians, 56 per cent of the Blends and 33 per cent of the other types died of tuberculosis, whereas only one Primitive and not a single Australoid died of it. Further investigation showed that the Iberian was much more susceptible to all other diseases than the Primitive. "This may be indicative that the European and Filipino offspring of the Iberian type is less resistant to disease in the tropics than is the aboriginal type on its own soil and in its natural environment." The author infers that a process of breeding out an alien stock is in progress. Although the Iberian stock has been added to the Primitive stock by repeated migrations, it does not retain its vigor when mingled with an aboriginal people in a new environment and succumbs to diseases like tuberculosis more easily than the original stock which has become suited to its habitat.

The author has brought much new and valuable material to aid the study of Anthropology and has added materially to our knowledge of the Filipino races.

New and Nonofficial Remedies, 1911. Containing descriptions of articles which have been accepted by the Council on Pharmacy and Chemistry of the American Medical Association, prior to January 1, 1911. Price, paper, 25 cents; cloth, 50 cents. Pp. 282. (*Chicago: Press of the Americal Medical Association.*)

This book, bound in paper, is furnished free to all members of the American Medical Association, but the reprint in book form is valuable for pharmacists, chemists and others. It differs from the first edition essentially only by the addition of more pages to describe new articles accepted by the Council during 1910. It would, on the whole, seem better than reprinting the entire volume annually to simply publish a small pamphlet of the new articles. The appearance of this work was noted in our issue of June, 1910, and it is a satisfaction to again call attention to this important publication.

Scientific Memoirs. By officers of the Medical and Sanitary Departments of the Government of India. New Series No. 40. *The Destruction of Fleas by Exposure to the Sun.* By CAPTAIN J. CUNNINGHAM, M. D., I. M. S. Price 9d. (*Calcutta: Superintendent Government Printing, India, 1911.*)

In a brief report of some carefully carried-out experiments Dr. Cunningham proves that fleas are rapidly killed in garments when exposed to the sunlight at a temperature of 120° F. That the method of exposing the clothes on a surface of sand may be used with success for this purpose is doubtless a useful discovery, but its practice must be limited. It is well, however, for all sanitarians to have their attention called to this report, as the system advocated is so simple.

Plaster of Paris and How to Use it. By MARTIN W. WARE, M. D., Adjunct Attending Surgeon, Mount Sinai Hospital, etc. Second edition revised, enlarged and illustrated. Price $1.25. (*New York: Surgery Publishing Company, 1911.*)

The excellence of this manual was called attention to in the issue of this journal of May, 1907. With some slight changes and the addition of more illustrations the author has succeeded in making it still more useful. It is a first-rate practical small handbook on the subject.

The Life History, Function and Inflammation of the Appendix. By ELDRED M. CONNER, M. A., M. C., F. R. C. S., etc. Price 1/. (*London: John Bale, Sons & Danielsson, Ltd., 1911.*)

In a short lecture delivered in Manchester (Eng.), during this year, the author propounds certain views as to the causation of appendicitis, and the use of the appendix, which seem strange—for instance that one of the great causes of the disease is the of white bread, since this contains very fine bits of steel— scopical in size—from the rollers with which the flour is gr His view of the use of the appendix is that its lymphoid throws out white cells to conquer either bacterial or other vaders. These ideas will require further proof before they be generally accepted as correct.

International Clinics, Vol. I. Twenty-first Series, 1911. Pri (*Philadelphia and London: J. B. Lippincott Company.*)

A paper on pellagra, several on syphilis, two on poliomy one on typhoid fever, and others on surgery, ophthalmology, ph iology, anatomy, biology and tropical medicine, etc., make th volume one of wide interest. In addition to the "Clinics" th is also a review of the "Progress of Medicine During 1910," w adds value to the work. Attention has been drawn so frequ to the character and scope of the "International Clinics," as as to their merit that a few items of the contents are me selected to show the variety of topics treated.

Diseases of the Nose, Throat and Ear—Medical and Surgical. WILLIAM LINCOLN BALLENGER, M. D., etc. Third edition vised and enlarged. Illustrated. (*Philadelphia and N York: Lea & Febiger, 1911.*)

It is but a year ago since we had the pleasure of noting appearance of the second edition of this excellent work. The b deserves its success, and the new edition is an improvement o predecessor. The author has carefully revised his previous w and made it still better for students and practitioners.

Das Radium in der Biologie und Medizin. Von PROFESSOR E. LONDON, Leiter der pathologischen Abtheilung an K. Inst für experimentelle Medizin zu St. Petersburg. Mit 20 Ab dungen in Text. Preis 6 Mk. (*Leipzig: Akademische lagsgesellschaft m. b. H., 1911.*)

This is neither a text-book nor a hand-book, but merely a made compilation of the use and value of radium in biology medicine. Until this pamphlet appeared no one seems to h taken the trouble to extract from the medical literature of countries the many and varied reports on radium as a therape agent, and here for the first time those who can read Germ have the opportunity to gather a clear idea of the general c sensus of the profession on the uses of radium. The work divided into A, the physical and clinical properties of radium and B, the physiological properties of radium. Section B is su divided into 4 parts as follows: 1. On the mechanism of action of radium on living bodies; 2. Its action on bacteria, fu ferments, toxins and antitoxins, plants and lower orders animals, process of embryonic development and regeneration on individual organs and tissues; 3. The general action of radium and its emanations on the higher orders of living beings Radium or Emanation therapy. There is a good bibliography, a few illustrations.

Scientific Memoirs. By Officers of the Medical and Sanitary De partments of the Government of India. New Series No. *The Applicability to Medico-Legal Practice in India of the Bi chemical Tests for the Origin of Blood-Stains.* By Lieu COLONEL W. D. SUTHERLAND, M. B., I. M. S. (*Calcutta: Sup erintendent Government Printing, India, 1910.*)

This is a carefully prepared report, but as the title indicates of interest only to a small number of the profession. Such ex periments as were carried out by Dr. Sutherland add, however, our general knowledge of biochemical problems, and from this partment of the Government of India much valuable informati has come.

(Philadelphia and London: W. B. Saunders Company, 1910.)

The author assumes the reader's preliminary training and erefore omits the consideration of the principles of surgery cept incidentally. He endeavors to give an account of the actice of surgery as it is seen in the accident ward and operatg room.

The plan of the book is unusual. In order to present the rious subjects in their true perspective the author takes up rgical diseases in their order of interest, importance, and freency, so far as he is able with due regard to sequence. He ooses appendicitis as the subject of the first chapter because pendicitis is the most conspicuous example of acute abdominal sease.

The book is divided into seven parts: I. The Abdomen; II. e Female Organs of Generation; III. Genito-Urinary Organs; . The Chest; V. The Face and Neck; VI. The Head and Spine; I. Minor Surgery, Diseases of Structure.

There are numerous excellent illustrations, and the book is cely gotten up. Many well-chosen references are given.

It is to be regretted that a number of interesting subjects are briefly considered. The author has accomplished his purpose of esenting the practice of surgery as surgeons see it, in a most tisfactory way, and the book will be a very welcome and useful dition to the library of the operating surgeon.

J. S. D.

slocations and Fractures. By Frederic Jay Cotton, M. D. Illustrated. $6.00 (*Philadelphia and London: W. B. Saunders Company, 1910.*)

Very little need be said in a review of this work. One has ly to glance through its pages to realize the thoroughness d detail with which the author has handled his subject. The t is clear and concise and is admirably elucidated by over elve hundred cuts, every one of which has been selected with greatest care. Indeed it is hardly necessary to read the text all, so well do the drawings illustrate the various fractures, locations and methods of treatment.

n view of the fact that operative procedures as regards fraces are being looked upon with more and more favor, it is sible that a little more space given to this side of the subject ght have added to the usefulness of the book. Dr. Cotton is tainly to be congratulated upon the success of his efforts.

Bertram M. Bernheim.

eases of the Skin. By James H. Sequeira, M. D., F. R. C. P., etc. Illustrated. Price, $8. (*Philadelphia: P. Blackiston's Son & Co.*)

lthough the price of this book seems large it is well worth money—the illustrations can hardly be bettered; the photophs are of exceptional excellence, and the "three color" ures are remarkable in demonstrating certain lesions. But is not the only merit of the work, which is an excellent text for students and the general practitioner. The description he diseases is clear, concise and simple, and the treatment tical and rational. The author has not dwelt much on the ology of the lesions, but after all, except for specialists, he given enough to make it evident to any student what the lamental underlying changes are due to, so far as is known. references to the literature are well selected, and the book ll respects seems to be fully abreast of the times. It is certo be well liked by students.

Pilcher Hospital was established a little over a year ago by Dr. Lewis Stephen Pilcher and his sons, and this Year-book is composed of a series of papers dealing with the surgical cases they have treated. Some of the articles have already appeared elsewhere, but a large number are new, and the Year-book, with a few illustrations, some of which are in color, is an evidence of the good work done by the Pilchers, and will be a stimulus to other surgeons, who have private clinics, to publish, either annually or at regular intervals, reports of the work done by them. The Mayos of Rochester have just issued a volume, and both these products are well worthy of note.

Burdett's Hospitals and Charities, 1911. The Year-book of Philanthropy and Hospital Annual. Twenty-second Year. 10/6. (*London: The Scientific Press, Limited.*)

It is always a satisfaction to receive this Annual which contains so much information on hospitals that is of value to all superintendents. The statistics furnished are well arranged and can be easily understood. To Sir Henry Burdett, the editor, a great deal of the progress in hospital administration is due. The life of charity institutions depends on the good management of their finances, and he it is who has so persistently, now for twenty-two years, drawn the attention of hospital administrators to the economies that can be practiced, by showing in comparative statistics, the different sums spent, for the same service practically, in various hospitals. To England his work must have been of incalculable value, and as stated above, superintendents in America can benefit themselves by a careful study of his reports, which are a mine of information on questions relating to hospitals, asylums, sanatoria, etc.

Chemistry of Food and Nutrition. By Henry C. Sherman, Ph. D. (*New York: The Macmillan Company, 1911.*)

Many books appear yearly on this subject and few of them are good, so that it is a real pleasure to call attention to Dr. Sherman's work, which is excellent; a serviceable book for the laity, who have some knowledge about digestion, as well as for students. While not entering too deeply into the chemistry the author gives a thoroughly satisfactory review of the best modern ideas of the metabolism of food in the human body and a clear statement of the proper food requirements for a normal individual. It is reliable and not too long nor too technical. Its success is assured.

Plastic and Cosmetic Surgery. By Frederic Strange Kolle, M. D. Illustrated. (*New York and London: D. Appleton & Co., 1911.*)

The author says the importance of Plastic and Cosmetic Surgery is undeniable and yet the literature on the subject is scanty and widely scattered. His object is to place before the profession a precise treatise on these subjects.

The headings of the chapters are as follows: I. Historical; II. Requirements for Operating; III. Requirements During Operation; IV. Preferred Antiseptics; V. Wound Dressings; VI. Secondary Antisepsis; VII. Anesthetics; VIII. Principles of Plastic Surgery; IX. Blepharoplasty; X. Otoplasty; XI. Cheiloplasty; XII. Stomatoplasty; XIII. Meloplasty; XIV. Subcutaneous Hydrocarbon Protheses; XV. Rhinoplasty; XVI. Cosmetic Rhinoplasty; XVII. Electrolysis in Dermatology; XVIII. Case Recording Methods.

One or two quotations taken at random may be of interest. "Lately a product under the name of antiphlogistin has been used locally (in erysipelatous infection) with excellent results and its use is to be commended even in local wound inflammation." "Unfortunately, these flaps (whole thickness), if they thrive, contract, leaving uncovered spaces, which must be treated separately or allowed to granulate."

The author has undoubtedly done a considerable service by collecting the literature and classifying it, but it is unfortunate that none of the references are given, although there are seven pages taken up by an index of the names of the authors quoted.

Several admirable original procedures are given and the case recording methods, especially by the making of plaster cas of interest.

Considering the object of the book the section on skin gr ing is rather disappointing. The most exhaustive chapters those on Hydrocarbon, Protheses and Rhinoplasty.

The volume is nicely gotten up and the illustrations are cellent. The book will be of especial use for reference in paring the relative values of the plastic operations perform different surgeons.

J. S.

BOOKS RECEIVED.

Collected Papers by the Staff of St. Mary's Hospital, Mayo Clinic, Rochester, Minnesota, 1905-1909. 8°. 668 pages. 1911. W. B. Saunders Company, Philadelphia and London.

Differential Diagnosis. Presented through an Analysis of 383 Cases. By Richard C. Cabot, M. D. Profusely Illustrated. 1911. 8vo. 753 pages. W. B. Saunders Company, Philadelphia and London.

The Blues (Splanchnic Neurasthenia), Causes and Cure. By Albert Abrams, A. M., M. D. (Heidelberg), F. R. M. S. Fourth edition, revised and enlarged. Illustrated. E. B. Treat and Company, New York.

Inebriety. A Clinical Treatise on the Etiology, Symptomatology, Neurosis, Psychosis and Treatment and the Medico Legal Relations. By T. D. Crothers, M. D. 1911. 8vo. 365 pages. Harvey Publishing Company, Cincinnati, Ohio.

Oxford Medical Publications. Text Book of Massage. By L. L. Despard. 1911. 8vo. 290 pages. Henry Frowde, London; Hodder & Stoughton, London.

Oxford Medical Publications. Handbook of the Surgery of the Kidneys. By W. Bruce Clarke, M. A., M. B. (Oxon.), F. R. C. S. With 5 plates and 50 illustrations in the text. 1911. 8vo. 199 pages. Henry Frowde, London; Hodder & Stoughton, London.

Oxford Medical Publications. Introduction to Practical Organic Chemistry. Including Qualitative and Quantitative Analysis and Preparations, with a Special Appendix on the London University Syllabus, and Schemes of Analysis for Stages 1 and 2 of the Board of Education Syllabus. By A. M. Kellas, B. Sc. (Lond.), Ph. D. (Heidelberg). 1910. 8vo. 204 pages. Henry Frowde, London; Hodder & Stoughton, London.

A Text-Book of Gynæcological Surgery. By Comyns Berkeley, M. A., M. D., B. C. Cantab., F. R. C. P. Lond., M. R. C. S., Eng. and Victor Bonney, M. S., M. D., B. Sc. Lond., F. R. C. S. Eng., M. R. C. P. Lond. With 392 figures in the text from drawings by Victor Bonney, and 16 colored plates. 1911. 8vo. 720 pages. Funk and Wagnalls Company, New York.

Manual of Cystoscopy. By J. Bentley Squier, M. D., and Henry G. Bugbee, M. D. 1911. 12°. 117 pages. Paul B. Hoeber, New York.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by Hobart Amory Hare, M. D. Assisted by Leighton F. Appleman, M. D., Volume I. March, 1911. 8vo. 355 pages. Lea & Febiger, Philadelphia and New York.

Die akute Leukämie. Von Dr. Albert Herz. 1911. 8vo. 184 pages. Franz Deuticke, Leipzig und Wien.

Diseases of the Nose, Throat and Ear. Medical and Surgi By William Lincoln Ballenger, M. D. Third edition, rev and enlarged. Illustrated with 506 engravings and 22 pl 1911. 8vo. 983 pages. Lea & Febiger, Philadelphia and N York.

Oxford Medical Publications. Cholera and Its Treatment. Leonard Rogers, M. D., F. R. C. P., F. R. C. S., B. S., I. M. 1911. 8vo. 236 pages. Henry Frowde, London; Hodde Stoughton, London.

Das Radium in der Biologie und Medizin. Von H. S. Lo Mit 20 Abbildungen im Text. 1911. 8vo. 199 pag Akademische Verlagsgesellschaft m. b. H., Leipzig.

Medico-Chirurgical College. Contributions from the Depart of Neurology and the Laboratory of Neuropathology for Years 1908-9-10. (Reprints) Volume I. [1911.] 4to. Phi delphia.

Vicious Circles in Disease. By Jamieson B. Hurry, M. A., M (Cantab.). With illustrations. 1911. 8vo. 186 pages Blakiston's Son & Co., Philadelphia.

Bulletin of Iowa Institutions. (Under the Board of Contr Published Quarterly. Volume XII, 1910.

International Clinics. A Quarterly of Illustrated Clinical Le tures and Especially Prepared Original Articles. Edited Henry W. Cattell, A. M., M. D. Twenty-first Series, Volu 1911. 8vo. 300 pages. J. B. Lippincott Company, Phila phia and London.

The Treatment of Syphilis with Salvarsan. By Sanitätsrat Dr Wilhelm Wechselmann. With an Introduction by Profes Dr. Paul Ehrlich, Only authorized translation by Abr. L Wolbarst, M. D. With 15 textual figures and 16 colored illu trations. [1911]. 4to. 175 pages. Rebman Company, Ne York; Rebman Limited, London.

Medical Annual. A Year Book of Treatment and Practitioner's Index. Twenty-ninth Year, 1911. 8vo. 991 pages. Jo Wright & Sons, Ltd., Bristol; Simpkin, Marshall, Hamilton Kent & Co., Ltd., London.

Prevention of Infectious Diseases. By Alvah H. Doty, M. D. 191 12mo. 281 pages. D. Appleton and Company, New York an London.

Oxford Medical Publications. A Manual of Practical Inorgan Chemistry. Including Preparations and Quantitative Analys with the Rudiments of Gas Analysis, etc. By A. M. Kellas, B Sc. (Lond.), Ph. D. Heidelberg. 1910. 8vo. 347 pages Henry Frowde, London; Hodder & Stoughton, London.

The Johns Hopkins Hospital Bulletins are issued monthly. They are printed by the LORD BALTIMORE PRESS, Baltimore. Subscriptions, $2.0 a year (foreign postage, 50 cents), may be addressed to the publishers, THE JOHNS HOPKINS PRESS, BALTIMORE; single copies will be sent b mail for twenty-five cents each. Single copies may also be procured from the BALTIMORE NEWS CO., Baltimore.

OF

THE JOHNS HOPKINS HOSPITAL

Entered as Second-Class Matter at the Baltimore, Maryland, Postoffice.

. XXII.—No. 247.] BALTIMORE, SEPTEMBER, 1911. [Price, 25 Cents

CONTENTS.

PAGE
iel Boylston, Inoculator, and the Epidemic of Smallpox in 3oston in 1721.
By Reginald H. Fitz, M. D. 315
y Newell Martin, Professor of Biology in Johns Hopkins Uni- versity, 1876-1893.
By Henry Sewall, M. D. 327
PAGE
Medical Notes on the Divine Comedy of Dante Alighieri.
By P. H. Dernehl, M. D. 333
Molière and the Physician.
By Max Kahn, M. A., M. D. 344
The New Department in the Johns Hopkins University. Art as Applied to Medicine.
By Max Brödel 350

ZABDIEL BOYLSTON, INOCULATOR, AND THE EPIDEMIC OF SMALLPOX IN BOSTON IN 1721.

By Reginald H. Fitz, M. D., Boston, Mass.

he recent centennial celebration, January 6, 1911, of the ston Medical Society of the Harvard Medical School, di- y leads to the thought who was Boylston whose name is so nately connected in Massachusetts with towns, buildings, ries, schoolhouses, corporations, associations, streets, rail- stations, charities, professorships and prizes? "A name," ding to John Quincy Adams,[1] "which if publick benefits impart a title to remembrance, New England will not forget: a name to the benevolence, publick spirit and ine patriotism of which this University, the neighboring polis, and this whole nation have long had, and still have reasons to attest: a name, less distinguished by stations endour, than by deeds of virtue; and better known to this e by blessings enjoyed than by favours granted: a name, e, which if not encircled with the external radiance of arity brightly beams with the inward lustre of benefi- "

Boylstons thus eulogized were members of a family ided[2] from Thomas Boylston, who at the age of twenty came to this country in 1635 and settled in Watertown, chusetts. His son Thomas, born in 1644-5, married Gardner of Muddy River, then a part of Boston, but set 1705 as the town of Brookline. This Thomas was the physician and surgeon of Muddy River and died in t the age of fifty. It is unknown where and how he received his medical training, unless, in part, in the Narragansett War in which he is reported to have been engaged. There is, however, no verification of the statement by Thacher[3] that he was a native of England and obtained the degree of Doctor of Medicine from Oxford. In his married life of thirty years there were born to him twelve children, the sixth being Zabdiel Boylston, who has gained undying fame as the founder in this country of inoculation as a preventive of the disastrous results of smallpox. Although other descendants of the first Thomas Boylston, through their benefactions and achievements, have been more immediately concerned with conferring popular distinction upon the name, it is especially among physicians that the name and fame of Boylston should be connected closest with the memory of this most meritorious physician of his day in America. This is all the more fitting since his nephew Thomas Boylston and his grandnephew, Ward Nicholas Boylston, in announcing their medical benefactions and gifts call particular attention to the great service rendered to humanity by their kinsman. Thomas Boylston's intended benefactions proved valueless in consequence of business reverses which caused the loss of his fortune. Ward Nicholas Boylston, the wealthy merchant, became a patron of medical education through his gifts to Harvard University, and the medical student's society is his namesake. Zabdiel Boylston, however, was a medical hero, of service to all mankind and his example should ever be memorable.

---

gural oration, when installed Boylston Professor of ck and Oratory, in June, 1806.

Vinton Memorial, 1858.

[3] American Medical Biography, 1828, I, 185.

Zabdiel Boylston was born in 1679 and died in 1766 in his eighty-seventh year. He was educated in medicine by his father and by Dr. Cutler, a physician of some note in Boston. He was not a graduate of Harvard College, from which his eldest son Zabdiel was graduated in 1724, afterwards going to England, where he died. Dr. Boylston attracted no especial attention until 1721. He then was living near Dock Square, not far from the residence of the Reverend Benjamin Colman,[4] pastor of the Brattle Street Church, who refers to "my house (which faces into the Doctor's yard)" and from which he was able to observe the behavior of the doctor's patients. At this time he was presumably one of the practitioners of medicine referred to by Dr. Douglass,[5] who states that there were fourteen apothecary shops in Boston and that every practitioner dispensed his own medicines. Indeed, he is called[6] an apothecary by an anonymous writer not friendly disposed to his cause. It is evident, however, from a communication to the *Boston News-Letter* of July 17-24, 1721, No. 912, signed W. Philanthropos, but written in the manner of Dr. Douglass, that his practice was also surgical. In this he is called a "*Cutter for the Stone*" and is spoken of as illiterate, ignorant and the producer of a "*dangerous quack advertisement,*" with but little experience in smallpox and without having at the time a patient with the smallpox under his charge.

Further evidence of Dr. Boylston's surgical qualifications is to be found in the Province Laws.[7] In these it appears that in 1707 he treated Captain Gridley for a broken arm accidentally received while in the expedition to Nova Scotia. In the same year he treated Mary Lyon, "grievously wounded by a Negroe Man," and in 1712 he cared for Joseph Smith, a soldier in the "late designed expedition to Canada." But whatever may have been the other medical or surgical qualifications of Dr. Boylston, they are wholly subordinate to his great work in beginning and continuing the inoculation of smallpox.

Towards the end of April, 1721, Boston for the sixth time was invaded by this disease. It had then a population of about 11,000. Aeneas Salter, at the close of the epidemic, was employed by the selectmen to make a scrutiny of the inhabitants and found[8] "that the number of persons who continued in Boston (many fled into the country) were 10,567, whereof about 700 escaped; the small-pox decumbitents had been 5,989, whereof 894 died, which is nearly one in seven." Of the previous epidemics that of 1678 had been especially fatal and that of 1702 was of recent memory to many of the inhab Since 1702 the population had nearly doubled in numbe generation of unprotected children had been born. It wa nounced in the *Boston News-Letter* of April 13-17, 1721, 893, that twenty or thirty deaths from smallpox were ta place daily at Barbadoes. In the following week it was sta that the Saltertudas fleet had arrived bringing the disea the town. Sewall writes in his diary:[10]

> **April 15th. . . . . Hold another Council about giving Liber Mr. Frizzle's Ship from Salt-Tartuda (Tortugas) to come u**

On the 8th of May it is learned:[11]

> **. . . . whereas a Certain Negro man is now Sick of the Sm pox in the Town who came from Tertudos in His Majesties S Seahorse which renders it very likely that that distemper now be on board that Ship. Therefor for the preservation of Inhabitants of this Town,**
>
> **Voted that John Clark, Esqre., be Desired to go on board Majesties Ship Seahorse and Report in what State of health Sickness the Ship's Company are in, Espetialy with respect the Smal Pox or other Contagious Sickness.**

There being a negro servant sick with smallpox at the h of Captain Paxton, near the South Battery, the first infe a nurse was ordered to attend the patient and a watch placed at the door. On the 12th of May it is recorded that Seahorse is infected with smallpox and the greater part of company were on a cruise. "Sundry other Sick on Shore that there is not aboue ten or fifteen Effective men on Boar The ship was ordered to Bird Island to prevent the spre the infection. A town-meeting was held on this day and voted[12] to seek the advice of the Governor and Council reference to sending the Seahorse with its two or three cas smallpox to Spectacle Island, "Pursuant to a Law of Province to prevent (God willing) the Spreading of the S Pox in this Town & Province."

By the middle of May, when the ship Francis left for L don, she carried the report that the disease was rife, alth in the *News-Letter* of May 15-22, 1721, No. 898, it was st that on the 20th of May there was but one case and th in the house where the disease first appeared. Neverthe a committee appointed to prepare instructions for the Bos representatives in the coming session of the General Ass proposed,[13] May 22, 1721, among other recommenda

"That they promõte some further Law Effectually to ena the Select men of Each Town to prevent the spreading of Infectious Sickness among them." A week later it was mitted[14] that on May 27 there were eight cases of the dis one in Bennett street, three in Tremont street, two in S street, one in Batterymarch street and one in Winter st On the 5th of June the school was transferred[15] to the Re sentatives' room in the Town-House.

---

[4] Some *Observations on the New Method* of Receiving the Small-Pox by *Ingrafting* or *Inoculating*. By Mr. Colman, 1721.

[5] Proc. Mass. Hist. Soc., I, 2d Series, 1884-85, 44.

[6] *A Letter* from one in the Country, to his Friend in the City: In Relation to their Distresses occasioned by the doubtful and prevailing Practice of the Inocculation *Of The* Small-Pox, 1721, 3.

[7] The Acts and Resolves of the Province of Massachusetts Bay, Vols. VIII and IX.

[8] *A Summary*, Historical and Political, *of The* First Planting, Progressive Improvements, and Present States of the *British* Settlements in *North America*. William Douglass, M. D., MDCCLX, Vol. II, 396.

[9] *Boston News-Letter*, April 17-24, 1721, No. 894.

[10] 5 Mass. Hist. Coll., 7, 288.

[11] Selectmen's Minutes, 1721, 81.

[12] Boston Town Records, 1721, 154.

[13] Boston Town Records, 1721, 154.

[14] *News-Letter*, May 22-27, 1721, No. 899.

[15] Selectmen's Minutes, 1721, 83.

The disease ex-
d also to the neighboring towns, especially to Roxbury, estown and Cambridge. In Charlestown it was reported[16] there were "lately" 100 deaths and that there were not than ten or twelve families which had not suffered from pox.

e physicians of Boston at that time whose names have down to us, were Drs. Archibald, Boylston, Clark, Cutler, onde, Davis, Douglass, Perkins, Williams and White. Of Drs. Clark, Douglass and Williams were liberally edu-, Clark and Williams being graduates in Arts of Harvard ge. Dr. Archibald had been surgeon of an English war- Dr. Dalhonde was a Frenchman who had seen service in gn wars, and Dr. Cutler was favorably mentioned by the ng clergymen, while Dr. Perkins was a pious neighbor of n Mather and of satisfactory skill. Several of these phy- is in after years were members of the first medical society lished in this country.

the outset of the epidemic the best educated physician of own was Dr. William Douglass, a Scotchman of about years of age who had been in Boston some three years had brought letters of recommendation to Increase and n Mather and to Benjamin Colman. These gentlemen well of him and were of some help to him, although but general notice was taken of him until he made himself n through his opposition to inoculation. He had received lucation in Edinburgh, Paris and Leyden and was the only cian in Boston at the time who had received the degree octor of Medicine, although it does not appear when and he obtained it. He was a well-read man of intelligence bility, but was conceited, injudicious, inaccurate and con- ous. Dr. Samuel A. Green[17] regards him as "a man of intellectual parts and a versatile writer. He knew nomy and could calculate eclipses; he had a taste for al history, and was withal an excellent botanist. He ed his medical cases, and took careful notes by the bed

the earlier part of his career, with which we are especially rned, his failings were more conspicuous than his virtues. ceful man he soon attained an influential position among lows. At first he was favored by the ministers, but as he neir esteem he became a bitter and violent opponent of views. According to the Reverend Peter Thacher,[18]

> reater part of the physicians in town & those of most emi- reprobated inoculation in the strongest terms. Douglass himself at the head and did not hesitate to use any as lawful or unlawful to destroy his antagonists. This who had in perfection the hungry penetration and the nting bitterness of his native country (not America), left thod untried to load Dr. B. with obloquy and prevent the of his practice.

Cotton Mather and had lent him certain numbers or a volume of the Philosophical Transactions published by the Royal Society, of which, at the time, he appeared to have had the only copy in Boston. Later another copy was obtained by John Campbell, publisher of the *News-Letter,* although he did not make its presence known[19] until five months after he had received it.

The volume was entitled "Philosophical Translations, Giving Some Account of the Present Undertakings, Studies and Labours of the Ingenious in Many Considerable Parts of the World. Vol. XXIX, for the Years 1714, 1715, 1716. London, 1717."

It may be that Douglass supposed that Mather's interest would lie especially in article IV of No. 339 for April, May and June, 1714, entitled, "An Extract of Several Letters from Cotton Mather, D. D., to John Woodward, M. D., and Richard Waller, Esq., S. R. Secr." There were twelve of these letters on various subjects communicated in 1712. Mather's attention, however, was fixed on article V, "*An Account* or *History,* of the *Procuring* the SMALL Pox *by Incision* or Inoculation: As *it has for some time been practised* at Constantinople. *Being the Extract of a Letter* from Emanuel Timonius, Oxon. & Patav., M. D., S. R. S., *dated* at Constantinople, December, 1713. *Communicated to the* Royal Society by John Woodward, M. D., Profes. Med. Gresh. *and* S. R. S." He also undoubtedly studied with care article No. 347 for the months of January, February and March, 1716, entitled, "Nova & TUTA Variolas *excitandi per Transplantationem Methodus nuper inventa & in usum Tracta: Per* Jacobum Pylarinum, Venetum, M. D., & *Reipublicae* Venetae *apud* Smyrnenses nuper *Consulem.*" These articles gave a statement of the method and successful result of the treatment of smallpox in Turkey and neighboring countries by inoculating healthy individuals with the disease.

Cotton Mather was quick to see the bearing of these articles on existing conditions, and the following entry appears in his published diary, for excerpts from which I am indebted to Mr. Worthington C. Ford, of the Massachusetts Historical Society:

> May 26, 1721. G. D. The grievous Calamity of the *Small-Pox* has now Entered the Town. The practice of conveying and suffering the *Small-pox* by *Inoculation* has never been used in *America*, nor indeed in our Nation. But how many Lives might be saved by it, if it were practised. I will procure a Consult of our Physicians, and lay the matter before them.

He prepared a letter to the physicians of Boston, giving an abstract[20] of these communications and suggesting some action. As this letter was the beginning of the battle which raged so

---

v England Courant, Jan. 15-22, 1722, No. 25.

tory of Medicine in Massachusetts, a Centennial Address ed before the Massachusetts Medical Society at Cambridge, 1881.

ssachusetts Magazine, 1789, I, 776.

[19] *News-Letter*, 1722, March 5-12, No. 945.

[20] To be found in "Some ACCOUNT of what is said of Inoculating or Transplanting the Small Pox by the Learned Dr. *Emanuel Timonius*, and *Jacobus Pylarinus*. With Some Remarks thereon. To which are added, A Few *Quaeries* in Answer to the Scruples of many about the Lawfulness of this Method. Published by Dr. Zabdiel Boylston, 1721."

violently the following extract from it is taken from "A Vindication of the *Ministers* of Boston from the *Abuses* and *Scandals* lately cast upon them in Diverse Printed Papers. 1722, 7."

> I will only say (writes the DOCTOR) that inasmuch as the Practice of suffering and preventing the *Small-Pox* in the way of **Inoculation** has never yet (as far as I have heard) been introduced into our *Nation;* where there are so many that would give *great Sums*, to have their Lives insur'd, from the *dangers* of this dreadful *Distemper*, nor has ever any one in all *America* ever yet, made the tryal of it (tho' we have several *Africans* among us, as I now find, who tryed it in their own *Country*) I cannot but move that it be *warily* proceeded in. I durst not yet engage, that the *Success* of the tryal here will be the same, as has hitherto been in the other *Hemisphere*. But I am very confident, no person would miscarry in it, but what must most certainly have miscarried upon taking it in the *Common way*. And I would humbly *advise* that it be never made, but under the management of a **Skilful Physician** who will wisely prepare the Body for it before he performs the Operation. *Gentlemen*, my *request* is, that you would *meet for a Consultation* upon this Occasion, and to *deliberate* upon it, that whoever first begins this practise, (*if you approve that it should be begun at all*) may have the concurrence of his *worthy Brethren* to fortify him in it.

This letter was dated June 6, 1721, and was directed to one of the physicians, a preacher and also "A Worthy Schoolmaster[21] (whom we did not reproach for going out of his Line for practising Physick)," with the request that he should communicate it to the physicians, with a separate note to one or two of them, and with the express request that Dr. Douglass should not be forgotten but should receive a copy of the letter. The latter gentleman evidently was aggrieved that Cotton Mather, a clergyman, should borrow his books and select therefrom communications upon a medical subject and recommend them to the consideration of the physicians of Boston without consultation with the owner of the books in question. He intimates[22] that before the physicians could meet, consult and report Dr. Boylston had been induced privately to make the trial. Nevertheless, there was no reply from the physicians nor did they hold a meeting, and it is probable that Dr. Douglass was exerting his influence against any action. In the meantime a watch was being set in accordance with the order of the Selectmen[23] of May 6, 1678, to control the removal of infected articles and to prevent the premature appearance in public of the patients. But the epidemic was spreading so rapidly that the guards were being taken from the infected houses as of no use. Persons, among others, Mrs. Boylston, were leaving the town to avoid the risk of contagion. Cotton Mather is filled with great anxiety with regard to two of his children who are liable to acquire the disease. He cannot make up his mind to send them away. He writes in his diary on June 13, "What shall I do with regard unto *Sammy?* He comes [illegible] the small-pox begins to spread in the neighborhood; [illegible] lothe to return unto *Cambridge*." His daughter [illegible] greater fear of the disease than her brother. June [illegible] cords: "I prepare a little Treatise on the *Small-P*[illegible] awakening the Sentiments of *Piety*, which it calls [illegible] then exhibiting the best Medicines and Methods, [illegible] world has yett had for the managing of it; and finally [illegible] the New Discovery, to prevent it in the way of [illegible] It is possible that this Essay may save the *Lives*, yea, [illegible] *Souls* of many People. Shall I give it unto the [illegible] I am waiting for Direction." It would appear from [illegible] that he made another attempt to interest the physicians [illegible] is written June 23: "I write a letter unto the [illegible] entreating them, to take into consideration the [illegible] fairs of preventing the *Small-pox* in the way of [illegible]

One of these letters was sent to Dr. Boylston and [illegible] printed[24] in a memorial of him by the Reverend Peter [illegible] of Brattle Street Church. It reads as follows:

> June 24, [illegible]
>
> **Sir,**
>
> *You* are many ways endeared unto me, but by nothing [illegible] than the very much good which a gracious God employs [illegible] honours you to do to a miserable world.
>
> I design it, as a testimony of my respect and esteem [illegible] now lay before you, the most that I know (and all that [illegible] published in the world) concerning a matter, which I have [illegible] an occasion of its being pretty much talked about. If upon [illegible] deliberation, you should think it advisiable to be proceeded [illegible] may save many lives that we set a great value on. But, if [illegible] not approved of, still you have the pleasure of knowing [illegible] what is done in other places.
>
> The gentlemen, my two authors, are not yet informed [illegible] among the [illegible] 'tis no rare thing for a whole [illegible] a dozen together to go to a person sick of the small [illegible] prick his pustules, and inoculate the humour, even no [illegible] the back of an hand, and go home and be a little ill, and [illegible] fever, and be safe all the rest of their days. Of this I [illegible] my neighbourhood a competent number of living witnesses.
>
> But see, think, judge; do as the Lord our healer shall [illegible] you, and pardon this freedom of, Sir,
>
> Your hearty friend and Servant
>
> Co. [illegible]
>
> **Dr. Boylston.**

This letter must have had a very decisive effect [illegible] Boylston's conduct. He was aware that in virtue of his [illegible] tion his household was especially exposed to contagion. [illegible] gent, experienced, skilful, encouraged and supported [illegible] influential citizen of the town, with the undaunted [illegible] accredited to him by Dr. Douglass, he undertook the [illegible] ment of inoculation on the 26th of June, 1721. He [illegible] inoculate himself, apparently for the reason that he [illegible] fered from smallpox in 1702, but he was so convinced [illegible] merits of the operation that he inoculated his son [illegible] six years of age, and two of his negro slaves, Jack, [illegible] years old, and Jackey, two and one half years old. [illegible] to Hutchinson,[25] "Inoculation was introduced upon [illegible] without hazard, to the lives of those who promoted it, he rage of the people." Against Dr. Boylston "the vul- re enraged to that degree that his family was hardly his house and he often met with affronts and insults in eets. . . . . Many sober, pious people were struck with and were of opinion that if any of his patients should ought to be treated as a murderer." I find no confirma- the statement of Thacher[26] that parties with halters ned to hang him to the nearest tree and that he was to remain secreted for fourteen days in his house in known only to his wife and that a handgrenade was into a room occupied by his wife and children. He tly states that his wife was out of Boston at the time of t inoculations and makes no mention of any specific offered him either by halters or grenades. As Thacher ledges his obligation to Ward Nicholas Boylston, a ephew of the inoculator, for information and as the vas a youth of seventeen at the time of Dr. Boylston's t is possible he may have obtained from him an account onal experiences which were not recorded at the time. on Mather's diary, however, gives a contemporaneous nt of the behavior of the people.

---

[21] Presumably Dr. Nathaniel Williams, H. C., 1693, and master of what became eventually the Boston Latin School.

[22] THE ABUSES and SCANDALS of some late *Pamphlets* In Favour of Inoculation of the SMALL POX, Modestly obviated, and Inoculation further consid'd in a Letter to A.... S...., M. D. & F. R. S., in London, 1722.

[23] Boston Town Records, 1678, 119.

[24] Massachusetts Magazine, 1789, I, 778.

[25] History of the Province of Massachusetts Bay, 1767, II.

> 16: G. D. At this time I enjoy *an unspeakable* Consola- have instructed one Physician in the New Method used *Africans* and *Asiaticks*, to prevent and abate the Dangers *Small-Pox*, and infallibly to save the Lives of those that wisely managed upon them. The Destroyer, being en- t the proposal of any Thing, that may rescue the Lives of r People from him, has taken a strange Possession of ple on this Occasion. They rave, rail, they blaspheme; lk not only like Ideots but also like *Franticks*, And not Physician who began the Experiment but I also am an f their Fury; their furious Obloquies and Invectives.
>
> 8: G. D. The cursed Clamour of a People strangely and possessed by the Devil, will probably prevent my saving of my Two Children, from the Small-pox in the way of ntation.

utcry against the inoculations was such that Dr. Boyls- the need of a public statement which should justify luct, and he makes the following announcement[27] in se of three weeks after his first experiment:

> patiently *born with abundance of Clamour and Ralary,* *ning a new Practice here, (for the Good of the Publick)* *mes well Recommended from Gentlemen of Figure &* *and which well agrees to Reason,* when *try'd & duly* *l*, viz., *Artificially giving the Small-Pocks*, by *Inocula-* *ne of my Children*, and *Two of my Slaves. in order to* *he hazard of Life, which is often indanger'd and lost* *istemper in the Common way of Infection: . . . . until* *Day, my little Son's Fever with the rage of the People,* *y affrighted me, but I no sooner us'd means. but the* *ated and the Small-Pocks came* out. . . . . *And in* *eks more, I hope to give you some further proof. And* *ing was new & for fear of erring in doing, I left it* *Nature, which needed no help in my Negro Man, who* *Symptoms abating, caus'd me to hope for the same in the others.*

Although twice called to account by those in authority for continuing the practice, he inoculated his son John, thirteen years of age, on the 17th of July, and four days later had seven inoculated patients under his care whom he invited his fellow-physicians to inspect. But one of them, Dr. White, accepted the invitation. It was now that the abusive letter already referred to and signed by W. Philanthropos appeared in the *News-Letter* as a criticism of Dr. Boylston's communication. It credited Cotton Mather with "a Pious & Charitable design of doing good" but had only contempt for Dr. Boylston. Within a few days a reply appeared[28] signed by the so-called inoculation-ministers. It reads as follows:

> To the Author of the Boston News-Letter.
>
> *Sir*
>
> It was a grief to us the *Subscribers*, among Others of your Friends in the *Town* to see Dr. *Boylston* treated so unhandsomely in the *Letter* directed to you last Week, and published in your Paper. He is a *Son* of the Town whom Heaven (we all know) has adorn'd with Some very peculiar *Gifts* for the Service of his Country, and hath signally own'd in the successes which he has had.
>
> If Dr. *Boylston* was too suddenly giving into a new Practice and (as many apprehend) dangerous Experiment, being too confident of the Innocence and Safety of the Method, and of the Benefit which the Publick might reap thereby; Altho' in that Case we are highly obliged to any Learned and Judicious Person who kindly informs us of the hazard and warns against the practice; yet what need is there of injurious Reflections, and any mean detracting from the known worth of the *Doctor?* Especially how unworthy and unjust (not to say worse) is it to attempt to turn *that* to his reproach, which has been and is a singular honour to him, and felicity to his Country? We mean those words in the Letter—*A Certain Cutter for the Stone*—Yes, Thanks be to *God* we have such a One among us, and that so many poor *Miserables* have already found the benefit of his gentle and dextrous Hand. We that have stood by and seen his tenderness, courage and skill in that hazardous Operation cannot enough value the *Man* and give praise to *God*. And we could easily speak of *other Cases* of equal hazard wherein the Dr. has serv'd with such Successes as must render him Inestimable to them that have been snatch'd from the Jaws of Death by his happy hand.
>
> The Town knows and so does the Country how long and what *Success* Dr. *Boylston* has practis'd both in *Physick* and *Surgery;* and tho' he has not had the honour and advantage of an *Academical* Education, and consequently not the *Letters* of some *Physicians* in the Town, yet he ought by no means to be call'd *Illiterate*, ignorant, &c. Would the Town bear that Dr. *Cutler* or Dr. *Davis* should be so treated? No more can it endure to see *Boylston* thus spit at. Nor has it been without considerable *Study*, expence in *travel*, a good *Genius*, diligent Application and much Observation, that he has attained unto that Knowledge and successful practice, which he has to give thanks to God for; and wherein we pray God that he may improve and grow with all humility.
>
> The meanwhile we heartily wish that Men would treat one another with decency and charity, meekness and humility as becomes fallible creatures, and good Friends to one another and their Country.
>
> As to the *Case of Conscience* referr'd to the *Divines*, we shall

---

., 187.

e, July 10-17, 1721, No. 85.

[28] Gazette, July 27-31, 1721, No. 88.

only say—What *Heathens* must they be, to whom *this* can be a question.

"*Whether the trusting more the extra groundless Machinations of Men, than our Preserver in the ordinary course of Nature, may be consistent with that Devotion and Subjection we owe to the All-wise Providence of God Almighty.*"

Who knows not the profanity and impiety of trusting in *Men* or *Means* more than in God? be it the best learn'd men or the most proper Means? But we will suppose what in fact is true among us at this Day, that Men of Piety and Learning after much *Serious tho't* have come into an Opinion of the Safety of the saulted method of *Inoculating the small pox;* and being perswaded it may be a means of preserving a Multitude of lives, they accept it with all thankfulness and joy as the gracious Discovery of a *Kind Providence* to Mankind for that end:—And then we ask, Cannot they give into the method or practice without having their *devotion and subjection to the Al-wise Providence of* God *Almighty* call'd in question? Must they needs *trust more* in *Men than in their Great Preserver* in the use of *this means* than of any other? What wild kind of Supposition is this? and the *Argument* falls with the *Hypothesis* in our *Schools*.

In a word, Do we not in the use of all means depend on GOD's *blessing?* and *live* by that alone? And can't a devout heart depend on God in the use of *this* means, with much Gratitude, being in the full esteem of it? For, what hand or art of *Man* is there in this Operation more than in *bleeding, blistering* and a Score more things in *Medical use?* which are all consistent with a *humble Trust in our Great preserver, and a due Subjection to His All-wise Providence*

Increase Mather.
Cotton Mather.
Benjamin Colman.
Thomas Prince.
John Webb.
William Cooper.

The above communication somewhat modified to meet with the approval of the other signers was written by the Reverend Benjamin Colman, whose original manuscript has been given to the Boston Medical Library by Dr. F. C. Shattuck. Its historical importance is such that Mr. Colman's letter is printed as originally written, at the close of this article.

Dr. Boylston was now a third time called to task[29] and a meeting of the authorities and the selectmen of Boston was held[30] July 21, 1721, "In Relation to the operation called Inoculation lately practiced in this Town by Dr. Boylston of this Place."

The sensational feature of this meeting was the testimony of Dr. Dalhonde who asserted that four out of thirteen soldiers inoculated at Cremona had died, Six recovered with "abundance of Trouble and Care" and three were unaffected. On opening one of the fatal cases the "Diaphragm was found livid, the Glans of the Pancrease tumify'd and the Caul gangreen'd." He stated that he had treated in Flanders a patient with smallpox who claimed to have previously been inocu five or six times, and whom he believed was incurable after his recovery. Of two Muscovite soldiers inoculat Spain one recovered and the other at the end of six "was seiz'd with a Frenzy, swelled all over his Body, his Lungs were found ulcerated, from whence they con that it was the Effect of that Corruption which havi fected the Limphæ did throw itself upon that Vital Part occasion'd his sudden Death."

At the same meeting the Practitioners of Physick and gery presented the following series of resolutions which based apparently on the testimony of Dalhonde, and demned the practice:

> It appears by numerous Instances, That it has prov'd Death of Many Persons soon after the Operation, and br Distempers upon many others which have in the End p deadly to 'em.
>
> That the natural tendency of infusing such malignant F the Mass of Blood, is to corrupt and putrify it, and if th not a sufficient Discharge of that Malignity by the Place cision, or elsewhere, it lays a Foundation for many dang Diseases.
>
> That the Operation tends to spread and continue the Inf in a Place longer than it might otherwise be.
>
> That the continuing of the Operation among us is lik prove of most dangerous Consequence.

According to Dr. Douglass[31] the Selectmen accepted view and forbade further inoculation, but Dr. Boylsto sisted "in *Contempt* of the Magistrates and in Contra to the Practitioners." Dr. Dalhonde's letter was pu and aroused anew the fears and wrath of the people, m whom were in a state of terror lest the disease should tended through the community by inoculation. Accor Cotton Mather,[32] "A Satanic fury raged, the town wa possessed with the Devil" and the writer was vilely "for nothing but instructing our base Physicians how many precious Lives." The Reverend Peter Thacher "It is not many weeks since the author of this accou informed by one of his [Dr. Boylston] childrens (whom are still living) of the expression of pious calmn trust in God, which he was wont to drop when his trembled at his leaving his house, for fear that he sh sacrificed to popular fury, and never visit it again." fortnight no further inoculations were made, and th were resumed to be continued in increasing numbers end of the epidemic.

Cotton Mather writes:[34]

> G. D.—Full of Distress about Sammy. He begs to have Saved, by Receiving the *Small-Pox*, in the way of *Inoc* whereof our Neighbourhood has had no less than Ten whereof our Neighbourhood has had no less than Ten able Experiments; and if he should after all dy by reas in the Common way, how can I answer it? On the other our People, who have Satan remarkably filling their Hea

---

[29] An Historical *Account* of the *Small-Pox Inoculated* in *New England*, Upon all Sorts of Persons, *Whites Blacks* and of all Ages and Constitutions. With Some account of the Nature of the Infection in the Natural and Inoculated Way, and their different effect on Human Bodies. With some *Short Direction* to the *Unexperienced* in this Method of Practice. Humbly dedicated to her Royal Highness the Princess of Wales by *Zabdiel* Boylston, Physician. London, MDCCXXVI, 61.

[30] Appendix to the Historical Account.

[31] The *Abuses* and *Scandals*, etc., 9.

[32] MS. Diary, July 27, 1721.

[33] Loc. cit.

[34] MS. Diary, Aug. 1.

> if he should happen to miscarry under it, my Condition be insupportable.
>
> Grandfather advises, That I keep the whole Proceeding e, and that I bring the Lad into this Method of Safety.
>
> ust 15. G. D. My dear *Sammy*, is now under the Opera- f receiving the *Small-Pox* in the way of Transplantation. uccess of the Experiment among my Neighbours, as well as l in the World, and the urgent calls of his Grandfather for 'e made me think, that I could not answer it unto God, if I ted it. At this critical Time, how much is all Piety to be l upon the Child!
>
> it may be hoped, with the more of Efficacy, because his t Companion (and his Chamber-fellow at the Colledge) dies 'ay, of the Small-pox taken in the common Way.

e opponents of inoculation now found a newspaper de- to their interests. This was the *New England Courant,* hed and sold by James Franklin, which first appeared on 7th of August, 1721. The *News-Letter* of Aug. 21-28, No. 917, contains a communication to its author signed *Your Friends and Well Wishers to Our Country and all Men."* In it the Courant is characterized as

> orious, Scandalous, full freighted with Nonsense, Unman- ess, Railery, Prophaneness, Immorality, Arrogancy, Cal- s, Lyes, Contradictions and what not, all tending to Quarrels ivisions and to Debauch and Corrupt the Minds and Man- f New England. And what likewise troubles us is, That it Currant among the People, that the Practitioners of k in Boston, who exert themselves in discovering the Evil culation and its Tendencies (several of whom we know to ntlemen by Birth, Learning, Education, Probity and good rs that abhors any ill Action) are said, esteem'd and d to be the Authors of that Flagicious and wicked paper.

es Franklin, the editor and printer, soon came to grief, er, through his published criticisms of the government as imprisoned. Zabdiel Boylston certified [35] to his illness in the jail and Benjamin Franklin, nominally, con- the publication of the paper.

pite the opposition of Dr. Douglass and most, if not all, practitioners and of the town authorities, inoculation ntinued. Dr. Boylston was supported in his action by ading clergymen of the town who wrote articles and lets, "tracts" in its favor. Some of them saw his ts and advised their parishioners to undergo the opera- d were themselves inoculated. Six of his own children, ther and his sister-in-law were thus treated.

General Assembly now transferred its place of meeting George Tavern at the outskirts of the town near Rox- nd, August 26, 1721, stationed guards at the doorway ent the entrance of any but authorized persons from ected region.[36]

rding to Cotton Mather:[37] "The Town has become an Hell upon Earth, a City full of Lies, and Murders, asphemies, as far as Wishes and Speeches can render it an seems to take a strange Possession of it in the epi-way of saving the Lives of People from the Dangers of the *Small-Pox.*"

As the epidemic increased in severity so did the number of those inoculated. The better educated and more intelligent were in favor of the method, but the people at large were in violent opposition and objected to the advice of the ministers. In the *Gazette* of October 23-30, 1721, No. 101, there appeared what may be regarded as a report of progress by one, evidently Dr. Boylston, familiar with the conditions.

> I. The Operation within these four Months past has been undergone by more than Three score Persons, Among which there have been *Old & Young; Strong* and *Weak; Male* and *Female; White & Black;* Many *serious* and *vertuous* People; some the Children of Eminent Persons among us. II. . . . . Only One Gentlewoman so circumstanced died; But her nearest Friends and all that knew her Case, do firmly believe the *Transplantation* was not the least occasion of it. *Of the rest, the following Account.* III. Of all the Number that have passed under the Operation, there has *Not so much as One miscarried.* It has done well *in all:* and even beyond Expectation in the most of them. IV. Some few have had a considerable Number of Pustules . . . . V. But the most by far, have endured in a manner *nothing.* Their *Pustules,* have been very few. From the time of the *Incision* to the time of their *Decumbiture,* (six or seven days) they have gone about their Business as at other times. After they began, and when they felt the Eruption coming on, they Satt up, and Read and Walk'd; and would have yet more expos'd themselves, if the Physician had not confined them. And they got abroad again sooner than what is ordinary for the Infected in the *Common Way* . . . . VII. The Patients return to their *perfect Health immediately;* and suppose themselves rather better than they were before the Operation . . . . VIII. Some of them have had nothing but a *Cabbage-Leaf* from first to last applied unto them. IX. Some, of whom the People have confidently affirmed *That they died under the Inoculation,* have sent their dying Charges unto their Friends, *To hasten into it.* These friends have done it; and so found their Account in it, and seen such *Easy Circumstances,* that the surviving Relatives of the Deceased are drowned in Tears, to think how the *Lives of Theirs* have been thrown away.

Nevertheless, the leaders in the opposition to inoculation continued to seek by legislation what the terrorizing of the mob could not effect. Apparently there was doubt whether protective measures against smallpox could be carried so far as to exclude inoculation. According to an Act in the time of William III the selectmen were empowered to remove patients with smallpox and place them in a special house. This had been established at Spectacle Island. Consequently, a town meeting was held November 4, 1721, and it was

> Voted [38] that whosoever shal come into this Town of Boston from any other Town Presumpteously, to bring the Smal Pox on him or her selfe, or be Inoculated, Shal be forthwith Sent to the Hospital or pest house, unles they See cause to depart to their own home, or if any Person be found in Town under that operation, which may be an Occasion of Continuing a malignant Infection, and Increasing it, among us, that they be Remoued Immediately Least by alowing this practis the Town be made an Hospital for that which may prove worse than the Smal pox, which has already put So many into Mourning, And that the Justices and Select men be desired to put the Method abouesaid in practis, without Delay as the Law Directs.

---

vince Laws, 1722, X, 174.
vince Laws, 1721, X, 105.
Diary, Aug. 24.

[38] Town Records, 1721, 159.

The Selectmen took early action, as it is recorded[39] November 13, 1721, that

> being Credably Informed that divers Persons belongin to other Towns are already come into this Town, and haue taken the Infection of the Smal pox, in the way of Inocculation, but that as yet the Infection has not Operated upon them yet Expect that in a few dayes it will, and that Divers others belonging to Other Towns, Intend to Come to this Town for the Purpose aforesaid, and that they know how to come in and where, and what Houses to use in Spite of the Town. And the Remoueing the Said Persons by Law being Impracticable but by Warrant from Some of his Majesties Justies of the Peace.
>
> The Said Select men Therefore doe hereby give notice to the Justices of this Town of the afore said Practice and pray that they will Isue forth their Warrants to search for such persons as have or are to come for such purposes and remove them to their respective houses or to the province hospital.

Cotton-Mather, however, though noting in his diary, November 3, 1721, the "Malicious and Murderous Manner" of the treatment received by him and despite, November 9, 1721, "the Sottish Errors, and cursed Clamours, that fill the Town and Country, raging against the astonishing Success of the *Small-Pox* Inoculated;" takes into his house his nephew, Mr. Walter, of Roxbury, for the purpose of being inoculated. While the latter was lying sick in his room, November 14. 1721, a lighted grenade intended for his host was thrown through the window, but the fuse became detached and burned itself out. On a paper attached to the fuse, according to the advertisement of Cotton Mather in the *News-Letter,* November 13-20, 1721, No. 929, were the words: "COTTON MATHER, *I was once one of your Meeting;* But the *Cursed Lye you* told of .... You know who; *made me leave* You, You Dog, And *Damn* You, I will Enoculate you *with this, with a Pox to You.*"

In Cotton Mather's diary[40] it is stated that "the *Granado* was charged, the upper part with dried Powder, the lower Part with a Mixture of Oil of Turpentine and Powder and what else I know not," and the sentence referring to the lie is not included. Hutchinson[41] who saw the grenade states that it did not contain powder but was filled with brimstone and bitumen. Although most writers in referring to this incident assume that the violence was due to Cotton Mather's efforts in favor of inoculation, the phrasing of the note in the "advertisement" suggests that the grievance was more specific and personal. Cotton Mather, however, writes:[42] "The Opposition to it has been carried on with senseless Ignorance and raging Wickedness. But the growing Triumphs of Truth over it throw a possessed people into a Fury, which will probably cost me my Life. I have Proofs, that there are people who Approve and Applaud the Action of Tuesday Morning: and who give out Words, that tho' the First Blow miscarried, there will quickly come Another that Shall doe the Business more effectually." He considers[43] himself as "Being in daily Hazard of Death from a Bloody People." It is possible that this of the grenade is the source of the previously mentioned ment that one was thrown into Dr. Boylston's house.

The report of progress above mentioned was followed course of a month by the communication of the Benjamin Colman[44] to the same effect. He visited and saw that

> they *found ease* and *sweetness* and lay *praising* GOD on their or rather sat up in their Chairs doing so. Their friends smiling about them. Their tongues were filled with and ours with Thanksgiving on their account when we see 'em . . . . We saw *scores* thus recover, even as went into the happy practice . . . . They were as discr religious a number of People, and Persons of as good understanding, and of as much caution and fear as their bors, who made these Experiments; and they did it with ness and humility, patience and silence, and many prayers much provocation from too many . . . . .

The distemper was now extended to Cambridge Boylston inoculated a number of the students and two instructors. The General Assembly had been sitting in bridge since November 7, 1721, having been adjourned town on account of the epidemic in Boston, and Shute, therefore, had asked for a short session. In the of a few weeks, however, one of the Boston members smallpox. It was supposed that he had become through the Speaker, Dr. Clark, who was the leading of Boston and in active practice. The Assembly imme adjourned and did not meet again until the following when the epidemic had ceased.

The custom of inoculating, urged as a duty by the citizens, ministers and magistrates, who offered exam themselves and in their families, now became definitel lished and ceased only with the disappearance of the

During its course Dr. Boylston had inoculated 244 and Dr. Thompson had inoculated 25 in Cambridge Roby 11 in Roxbury. Dr. Boylston had inoculated 10 in Charlestown, but was so busy in Boston and Roxbury could see them but once. The *Courant* states:[45] "We Persons have had the Small Pox inoculated upon them bury." Of the 280 inoculated persons only six died, tality of one in forty-six, in contrast to one in six or those who had become diseased through contagion.

Reports now were received from London of the intr of inoculation into England. The *News-Letter* of 16-23, 1721, published as news from London that

> A Representation has been made to his Majesty, Physicians, that the Small-pox may be communicated, great Success, by Incision or Inoculating, as 'tis commonly as might be experienc'd, if some proper Objects to were found out. And we are assured that two of the Prisoners, now in Newgate, have offered themselves to the Experiment, upon Condition of receiving his Majesty gracious Pardon.

In the *Gazette* of October 23-30, 1721, it was announ the eruption had appeared on some of the inoculated

---

[39] Selectmen's Minutes, 1721, 90.

[40] MS. Diary, 14 Nov., 1721.

[41] Op. cit., II, 249.

[42] MS. Diary, 19 Nov., 1721.

[illegible] Nov., 1721.

[44] Some *Observations on The New Method,* etc., op. cit.

[45] *Courant,* Dec. 5-Jan 1, 1721-2, No. 22.

[illegible] from the *London Mercury* of September 16, : "Great Numbers of Persons in the City and in the rbs are under the Inoculation of the Small Pox. Among est the oldest Son of a Noble Duke in Hanover Square."

rease Mather published[47] an account of the communica- of Dr. Walter Harris of London with regard to the inocu- of small-pox. In this is an abstract of the communica- of Timoni and a statement of the inoculation of the ren of the Hon. Wortley Montague. The *News-Letter* arch 5-12, 1722, No. 945, reports from the *St. James's ing Post,* August 17, 1721, the letters of Timoni and of ini as printed in the Philosophical Transactions and Dr. Douglass had refused to show even to the Lieu- t Governor after they had been returned by Cotton er. Mr. Campbell, the publisher of the *News-Letter,* a note to the effect that a copy of these letters had been possession for five months.

e epidemic had now come to an end and Dr. Boylston's s met with a deserved recognition from Isaac Greenwood, vards Professor of Natural Philosophy in Harvard Col- He published, February 25, 1721, 2, a pamphlet en- , "A Friendly Debate; or a DIALOGUE between ACADEMI- nd SAWNY & MUNDUNGUS, Two Eminent PHYSICIANS, Some of their Late PERFORMANCES." This he dedicated llows:

> **my very Worthy Physician, Mr. ZABDIEL BOYLSTON.**
>
> **iow no Person so proper, to present the following Dialogue your Self.**
>
> **h has been your undaunted Resolution, and truly Heroic ge, thro' the whole Course of your dangerous Enterprize; uch Your Conduct and Wisdom, as merit our highest Re- and most public Thanks. To *You* under the Auspicious lence of GOD, we are Indebted for the Blessing of INOCULA- for you can claim the undivided Honour of Introducing it ; us. And hadst not thou began it, perhaps, there would ve been found a Soul so truly great, as to have undertaken r this, Sir, I am bold to say, Your Name shall be mention'd Honour, whilst those Physicians, and others, who have z'd themselves by their Malice and opposition to you, shall erwise spoken of.**

ated cases still occurred and the Selectmen found it ent to make the following proclamation,[48]

> **pril, 1722: WHEREAS *sundry Evil-minded Persons have of dustriously reported in the Country Towns, that the Small again very brief in this Town, many Persons now Sick of istemper, and several lately dead. This is to Certifie that port is false & groundless, there being but three Folks now to have the Small-Pox; . . . . Could the Inventor of such ous Lyes be fully discovered it would be of Publick Ser- If any Families that have had that Distemper have not aired their Houses and Bedding. It is Recommended to h more especially Innholders and those that entertain airing and cleansing their Houses and Bedding.***

On May 11, 1722, however, Dr. Boylston inoculated six persons and on May 15, 1722, it was voted[49]

> **that a gard be forthwith Set at the House of Mr Joseph Hubbard, Blacksmith to prevent the Removal of Mr Saml1 Sewal and Sundry others at Said House without orders and Direction of of the Select men they having bin Inoculated for the Smal Pox.**
>
> **Voted also that there be a gard Set at the House of Coll John Alford for the Same Reason Mrs Joana Alford being there and having Inoculated.**
>
> * * * * * * * * * *
>
> **Voted that a message be sent to Coll John Alford (by Doctr Boylston & Constable Titmarsh) to acquaint him that the Select men Doe Assigne Spectakle Island to be [the] place his Sister be forthwith Remoued unto.**

At the same meeting a committee was appointed[50] to draw up instructions for the representatives of Boston to present to the Assembly for the purpose of preventing the practice of inoculation in any town or place without the approval of the Selectmen. This vote was passed because there had been dispute whether the law relating to the spreading of smallpox gave full power to the Selectmen to do what was needful to prevent the spreading of any contagious distemper and remove persons who may be infected.

On the same day the Selectmen applied[51] for a warrant to remove Mr. Sewall, his wife, two children and one other of his family who had been inoculated from Mr. Hubbard's house to Spectacle Island, also to remove Joan Alford.

The committee appointed at the town meeting of May 15, 1722, reported[52] three days later:

> **We also in a Special manner Recomend to your Consideration what Refers to the preventing the Spreading of any Contagious Distemper And whereas the Inoculating or Transplanting of the Smal pox has of late bin practised among us to the Terror of many of the Inhabitants.**
>
> **We desire you to use your best Endeavor that it may be under a propper Regulation, and not practissed in any Town or place without the approbation of the Select men of Such Town, And in as much as there has bin some late Dispute about the meaning of the Law that Refers to preventing the spreading of the Smal pox, etc., whether the Select men have full power to doe what is needfull to prevent the Spreading of any Contagious distemper and Remoue persons that may be Infected. It is therefore proposed that the Select men of Every Town may be Clothed with full power to obtain the great End & Designe of that Law, which is for the Preservation, Health and Safety, of the Inhabitants.**

In the *Courant* of May 14-21, 1722, No. 42, the following notice is inserted:

> **By the Select-Men of Boston**
>
> **Whereas it is reported in the Country Towns, That great Numbers are now sick of the Small Pox in Boston, not only in the Common Way, but also that greater Numbers are inoculated for that Distemper, These are therefore to signify That the said Report is false and groundless; for that according to the best**

---

rant, Dec. 25-Jan. 1, 1721 (2), No. 22.

ette, Jan. 29-Feb. 5, 1721 (2), No. 115; also, Some further from *London* of the *Small-Pox Inoculated.* The Second , 1721 (2).

s-Letter, April 9-16, 1722, No. 950.

[49] Boston Town Records, 1722, 165.

[50] Boston Town Records, 1722, 165.

[51] Selectmen's Minutes, 1722, 97.

[52] Boston Town Records, 1722, 166.

> Informations, there are not above three or four now sick in the Town in the Common way; and the Select Men having sent for Dr. Boylstone, he solemnly declared in the publick Town-Meeting, that there were no more than six Persons in Boston under Inoculation of the Small-Pox, and that it was performed on them on *Friday* and *Saturday*, the 11th and 12th Instant; And the said Doctor Boylstone then also did solemnly declare and promise That he would not either directly or indirectly inoculate any Person within said Town for the Future *without License* and Approbation of the Authority of the Town.
>
> Whereupon they may also certify, That the said Six Persons under Inoculation, were by Order of said Select Men, and Warrant from Two Justices of the Peace, immediately sent down to the Hospital on Spectacle Island.

According to Hutchinson,[53] the Representatives passed a bill prohibiting inoculation, but the Council refused to agree to it. It took special action, however, with reference to the inoculated persons at Spectacle Island by ordering,[54]

> 2 June, 1722. That the persons so Inoculated shall not Come up to the Town of Boston during this present Session of the General Assembly without Leave first obtained.

The simultaneous introduction of inoculation in England, although meeting with decided opposition, was not attended with such excitement and fear as in Boston. At this time Sir Hans Sloane was one of the most distinguished physicians in London. He was President of the Royal College of Physicians, Physician-General to the Army, one of the physicians to Queen Anne and present in her fatal illness. He was also the physician of the Princess Caroline, wife of George II. He had been Secretary to the Royal Society, and it was at his instigation that Pylarini had written the account of inoculation published in the Philosophical Transactions in 1716.

His participation in the introduction of inoculation into England led him to prepare a statement which he intended should be published in 1736, although it was not printed until some twenty years later.[55]

It appears that the Princess Caroline had become interested in the subject on account of the dangerous illness of her daughter whom Dr. Sloane was treating for smallpox, and doubtless had been made acquainted with the communications in the Philosophical Transactions. She knew of the successful inoculation of the Montague children and requested that the experiment might be tried upon some condemned criminals who were to be freed in case of its success. This was done by Mr. Maitland, the surgeon who had inoculated the Montague children. In order to test the protective influence of the inoculation Sir Hans Sloane and Dr. Steigerthal, physician to George I, hired one of the inoculated criminals to act as nurse and bedfellow to a patient with smallpox. Princess Caroline also caused several charity children to be inoculated. The success of these inoculations and of others led the princess to ask Dr. Sloane for his opinion of the expediency of inoculating her daughters. Through his statements to her and to George I, two of her daughters were inoculated,[56] April 19, 1 Sergeant-Surgeon Amyand under the direction of Si Sloane. Two years later two of her sons were inoculat in Germany by Mr. Maitland, the other in London by Se Surgeon Amyand, again under the direction of Sir Sloane.

The progress of inoculation during the epidemic in B had been followed in England. The Reverend Mr. Math a statement,[57] dated March 10, 1722, showing the morta inoculated smallpox to have been only one in sixty, al at a later period in England there were but two deaths cases. This contrast led Dr. Jurin, then Secretary Royal Society, to consider that the operators in Englan more cautious. That this was not the universal opin pears in an extract from the letter of Dr. Thomas written from Salem, June 4, 1723. In this he states:[58]

> We don't as yet See any ill Effects of Inoculation, but the oculated are as yet as well, and some of them a great deal than ever; as for the ill Consequences that have been in E I can't tell what they may arise from, but I can hardly think are the genuine effects of Inoculation, but may arise from previous Disposition to such Distempers as you mention or want of due Evacuation after Inoculating and too soon he the places of Incision.

With the diminution in the mortality from smallp England came a lessening in the frequency of inoculation in 1725 the number of deaths from smallpox in Lond 3188, one-eighth of the total mortality,[59] although during year only 151 persons were inoculated in Great Britain only 105 persons in the following year.

It was at this time that Zabdiel Boylston spent a ye England. He was then the inoculator with the large dividual experience, although his publications on the were but few and brief. It is quite possible that he had invited to visit England for the purpose of presenting experience, especially as he had made no further comm cation since the cessation of the Boston epidemic in Douglass[60] suggests that he went to England to seek pro employment as an experienced inoculator on account of of business at home. This slur was immediately answe in a communication dated March 3, 1729, 30, in which stated that Dr. Boylston, though often asked, refuse inoculate persons while in London.

It is quite probable that Sir Hans Sloane invited him visit London, certainly he urged him to publish his experie The latter is made apparent in his preface to the "Histo Account." In this he declares that

> Writing is a Talent which, of all Things, I never made Pretentions to and little thought of giving at this Time

---

[53] Op. cit., II, 249.

[54] Province Laws, X, 161.

[55] Phil. Trans., 1755, XLIX, 516.

[56] The *History* of the *Inoculation* of the *Small-Pox* in *Britain*, etc. William Woodville, 1796, I, 104.

[57] Phil. Trans., XXXII, 1724, 213.

[58] Phil. Trans., XXXIII, 1726.

[59] Woodville, op. cit., 175.

[60] Dissertation Concerning Inoculation of the Small-Pox. 17

[61] A LETTER to Doctor ZABDIEL BOYLSTON; Occasioned by a DISSERTATION CONCERNING INOCULATION; Printed at B MDCCXXX.

> l a Message from a Superior Person that an Account of my ıss of inoculating the Small-Pox in New England might be ful, as being of great use, and beneficial to the Publick, I m'd it as the strongest Obligation upon me so to do, and in ›liance to that Command I have done it faithfully. If I had ›sed any Advantage to myself, in the Practice here, I should done it above a Year past, on my Arrival in London, and ıow on my return home.

is surmised that Dr. Boylston first presented his ex- ınce to the Royal College of Physicians of which Dr. ne was President, or to the Royal Society of which he made a member in July, 1726, but direct evidence upon point is lacking. The only published [62] communication e by him to the latter is on "Ambergris in Whales," ence to which and to his love for horses is to be found in a letter in the Massachusetts Historical Society from him enjamin Colman, dated London, February 26, 1724, 5. ıe "Historical Account" is printed in almost a sumptu- ıanner as compared with the second edition published in ›n in 1730. Its form suggests that Dr. Boylston's affairs in a prosperous condition at the time, and additional ınce on this point, as well as of a kindly if not forgiving ısition, is afforded by Ward Nicholas Boylston's state- [63] of his interview with Benjamin Franklin. While near in 1783, Mr. Boylston was introduced to Franklin who :o him,

> shall ever revere the name of Boylston; Sir, are you of the of Dr. Zabdiel Boylston of Boston?" to which I replied ıe was my great-uncle, "then, Sir, I must tell you I owe ching I now am to him. . . . . When Dr. Boylston was in nd, I was there reduced to the greatest distress, a youth ut money, friends or counsel. I applied in my extreme dis- to him, who supplied me with twenty guineas; and relying judgment, I visited him as opportunities offered, and by therly counsels and encouragements I was saved from the of destruction which awaited me, and my future fortune ased upon his parental advice and timely assistance. Sir, you will visit me as often as you find you have leisure while is."

le remains to be recorded of Dr. Boylston's career subse- to his return to Boston, which he reached before the October, 1726. He resumed his practice, which must ›een greatly in demand after his reception in England. l it is called [64] "great in town and country" and "every tioner gives him the preference to Douglass in curing ." The practice of inoculation had become so well shed that in the epidemic of 1729-30, imported from Ire- the Selectmen no longer were urged to remove the ıted to the pesthouse, but precautions were recommended tect the inhabitants from those inoculated within the The following extract [65] from the Town Records illus- this change of sentiment. At the town-meeting of

habitants

> That the Town might Consult proper methods for preventing the spreading of the Small Pox by Inoculation.
>
> Since the Date of which Petition a Considerable Number of the Inhabitants within a few days past have bin Inoculated, and Sundry Others are preparing therefore, In Consideration whereof the Town came unto the Following Vote,
>
> That it be Earnestly Recommended to the Inhabitants and Freeholders and in an Especial Manner to Masters of Familyes. That all Proper care be taken That Such Persons as Shall for the Future be Inoculated for the Small Pox do Imediately keep in their Houses First giving notice to the Neighborhood of Such their Designs, And that during the Opperation of the Distemper all proper Methods be taken to prevent it's Spreading. And that they would not come or walke abroad in the Streets, Lanes or Alleys within the Town Until their Incisions are well clensed and Healed: Further that the Practitioners in Physick would give to the Select men or to the Town Clerk, the number of Persons by them Inoculated once a week at least, with an Impartial Account of the Operation on their Several Patients in the Course of their Inoculation.

Of the physicians who originally had opposed inoculation, Dr. Williams [66] entered upon its practice in 1730 "with the utmost caution." Dr. Cutler [67] writes to Dr. Gray of London, May 30 (1730?):

> The Small Pox is now overspreading this town and strikes terror into the whole country. The Contagion has proved mortal to many, and has therefore inclined great numbers to venture upon inoculation, which has been attended with great success. I have submitted my wife and seven children and a servant to the practice. The most visible effect of this affliction is to *set us in parties*. The main of the church are against it; and it seems that he is no Churchman or Christian who is for it.

Even Dr. Douglass [68] regarded it as "a considerable improvement in Physick." He states that most of those opposed acknowledge that inoculated smallpox is easier than when the disease is accidentally received, that the former is less fatal and that the symptoms are more favorable. He finds that it is the custom for the practitioners to inoculate when requested, but not to persuade or dissuade the applicant. In the last years of his life he became a more earnest advocate and recognized [69] that

> The novel practice of procuring the Small-pox by inoculation, is a very considerable and most beneficial improvement in that article of medical practice . . . . The small-pox received by cuticular incisions has a better chance for life and an easy decumbiture; that is, the small-pox so received is less mortal and generally more favourable, than when received in the accidental or natural way.

---

l. Trans., 1726, XXXIII, 193.

E. Hist. & Genealog. Reg., 1881, XXXV, 150.

etter to Doctor *Zabdiel Boylston*, etc., 1730.

ton Town Records, 1729, 14.

[66] The METHOD of Practice in the SMALL POX with Observations on the Way of Inoculation. Taken from a Manuscript of the late Dr. Nathaniel Williams, etc. Edited by Thomas Prince, MDCCLII, 13.

[67] A Brief Memoir of William Douglass, M. D. By Timothy L. Jennison, M. D., Mass. Med. Soc. Comm., 1834, V, 236.

[68] Dissertation Concerning Inoculation of the Small Pox, MDCCXXXI, 8.

[69] *A Summary*, etc., op. cit., II, 406.

He continues[70] to credit Cotton Mather with no other motive than "the desire for the *imaginary honour* of a new-fangled notion," and his sentiments towards Dr. Boylston remain unchanged. For he adds in a foot note,[71] "This undaunted operator imagined that by going to London with a quackbill of his inoculation performance in New-England, he might acquire a fortune in London; but so it happened, that void of common discretion to couch his ignorance and silly mean assurance, he returned to Boston without being called upon to perform any inoculation."

By way of contrast his friend, Dr. Isaac Watts, writes to Dr. Boylston from Newington in a letter of April 25, 1735, reproduced by Peter Thacher[72] in his memoir, "The inoculation was a glorious and successful retreat, or if you will, a victory over the powers of death in Boston, when it was first practised under your conduct. It has not been so happy among us in England, nor do I find it has been equally happy in New-England since, but the want of conduct in the undertakers, may be are considerable cause of it."

After the publication of the American edition of Bolyston's Historical Account, in 1730, there was no further epidemic of smallpox in Boston until 1752. Douglass relates[73] that

> A ship from London, Capt. Cousins, with the small-pox aboard, was bulged Dec. 24, 1751, in Nahant bay near Boston; the people of Chelsey, the adjacent town, compassionately assisting to save the ship's crew, received the small-pox; about one in four or five died. . . . . It arrived in Boston in January following, by a sailor belonging to the Ship, and got into five or six families, but did not much spread till the twentieth of March, 1752, and Monday the twenty-third, inoculation was let loose; some greedy practitioners indiscriminately inoculated any persons who could be pursuaded to receive it, even pregnant women, puerpeas, old negroes, and the like.

Of the 15,734 residents of the town 1800 fled through fear of the smallpox; of those remaining 7,653 had smallpox; of these 2109 were inoculated.[74] The mortality among those not inoculated was one in ten or eleven, while of the inoculated only one in sixty-eight died. In England under Daniel Sutton and his assistants, between the years 1764 and 1766, nearly 20,000 persons were inoculated with but three deaths and these were not fairly attributable to the inoculation.[75]

Dr. Boylston thus lived long enough to see inoculation well-established and successful and to know that he was recognized as one of the world's benefactors.

Dr. Thomas Boylston, the father of Zabdiel, owned a homestead of ninety-six acres in Brookline which after his death was deeded and sold to Peter Boylston by his brothers and sister. About the year 1736, Dr. Zabdiel Boylston, who is said to have accumulated a handsome fortune, bought the homestead of his brother Peter, who removed to Boston and ope shop.[76] After purchasing the homestead, he built the man still standing in excellent preservation and now the resi of Mr. George Lee. In 1741 his brother Peter's pew transferred to him, and in 1744 he voted at a town meetin Brookline. It is known that he continued to practise medi until he was over seventy years of age, for among the MSS the Boston Public Library is a certificate which Zabdiel B ton of Boston gave to Thomas Fleet in November, 1752, t effect that the physical disability of the latter was such a prevent his being exposed as a watchman in bad wea This library also possesses a receipt from him for medi and attendance dated Boston, April 23, 1753. It is pro that Dr. Boylston resided continuously or interrupted Brookline during this period, but eventually he retired t country seat where, according to Peter Thacher, "enfe by age and disease he passed his last days in the dignity ever accompanies those who have acted their part well in

Inscribed on his tomb in the old cemetery at Brookline far from his boyhood's home, are the words:

> **Sacred to the memory of Dr. Zabdiel Boylston, Esq., physi and F. R. S. who first introduced the practice of inoculation America. Through a life of extensive benevolence, he was alw faithful to his word, just in his dealings, affable in his man and after a long sickness, in which he was exemplary for patience and resignation to his Maker, he quitted this m life in a just expectation of a happy immortality, March 1, 17**

The following is the text of the manuscript letter of Reverend Benjamin Colman in the possession of the B Medical Library which seems to have served as the origin that published in the *Boston Gazette* of July 27, 1721, signed by Increase Mather, Cotton Mather, Benjamin Col Thomas Prince, John Webb and William Cooper.

To the Reverend Mr............ of *Boston*.

Sir, It was a pleasure to me yesterday to hear you express Sense you have of the unworthy Treatment which Dr. Boy has received this week in the *Boston News-Letter*. The ang contemptuous Letter there is below the Learning & Worth of *Gentleman* who is said to write it. It breathes nothing of native Modesty & Meekness which adorns Dr. *Douglass*. nor covers that purity of Style & Diction which one wd expect his Erudition. Besides, He has met with so kind & cordial Esteem in the Town, as were enof to subdue the heart rough & unpolished Stranger (the Reverse whereof he is) most humane & placid treatment of every body belonging to Entirely dismiss ye tho't therefore that one of his Silen Civility is capable of this sudden & angry Effort against a of the Town, whom Heaven (he knows & we all know adorn'd with some very peculiar Gifts for the Service of country, & has signally own'd in the Success which he has

If Dr. *Boylston* was too suddenly giving into a new prac dangerous Experiment & and also was too confidant of the cence & Safety of ye Method & of the benefit wch the Public reap thereby; altho' in that case we are highly obliged to learned & judicious Person who kindly informs us of the ha & warns against the Practice; yet what need is there an jurious words, or mean detracting from the known worth of honour to him & felicity to his Country? I mean those ds in the Letter—*a certain Cutter for the Stone.* Yes, thanks :o God that we have such a *One* among us, & that so many r Miserables have already found the benefit of his gentle & trous Hand. We that have stood by & seen his tenderness, ·age & skill in that hazardous Operation cannot enof value Ian & give praise to God. And I could easily speak of other es of equal hazard, wherein the Doctor has served with such cesses, as must render him Inestimable to them yt. have been :ch'd from the jaws of Death by his happy hand.

---

[70] *Summary*, etc., II, p. 409.

[71] *Summary*, etc., p. 409.

[72] Loc. cit.

[73] *Summary*, etc., II, 347.

[74] Selectmen's Minutes, 1752, 283.

[75] The Practice of Inoculation Justified, A Sermon by Robert Houlton, M. A., Chaplain to the Earl of Dorchester and officiating ([illegible]man of Mr. Sutton's. Essex, 3d Ed., 1767.

[76] Selectmen's Minutes, July 7, 1737.

blame the Letter for gross *partiality* wch treats Dr. *Boylston* ı so severe a Surmise as to say, that he understood the matter noculating *without a serious tho't;* when at ye same time it the goodness to suppose of another *Doctor*, a *Divine* among (who push'd on ye Attempt & openly rejoiced in it) that he d *out of a pious & charitable design of doing good.* I verily eve Dr. *Mather* did so, & why should I not hope the same of *Boylston?* Is it that a Dr. in *Physic* or a Master in *Surgery* ot capable of the like pious & charitable design with a Dr. *ivinity?* I am sure I ought to judge ye *best* of my Nei'bours, gns, & *who art thou to forget another?* Well, but this *Boylston is erate*, says the Letter; that is to say, He has not had ye Ad- :ages of a Liberal Education, which Dr. *Clark*, Dr. *Williams* r. *Douglass* have had. He ought to vail to them therefore on account & congratulate them their Advantage. But must he be efore called *ignorant & quack?* as the Letter rudely calls him: ıld ye Town bear that Dr. *Cutler* & Dr. *Davis* should be so ted? No more can it endure to see *Boylston* thus spit at.

ıe *Town* knows & so does ye *Country* how *long* & with what *ess* Dr. *Boylston* has practis'd both in *Physic & Surgery;* & he has not ye *Letters* of some Physicians in the Town, yet he been so happy as to have had more *practice* it may be than one, Dr. *Clark* excepted: Nor has it been without considerable ;y, expence in *Travel*, a good *Genius*, diligent application & a t deal of observation, that he has attain'd unto that knowl- & successful practice wch he has to give thanks unto God & wherein I pray God that he may improve & grow with all ility. Then he would not fear want of Business, nor I trust sefulness & Esteem: for there are but too many likely to need even in Cases wherein none beside him can as yet equally :.

is I have said in Justice & friendship, as to Dr. *Boylston* & umerous *Family* to whom I ought to wish well, as likewise *Others* among us who have gone into favourable opinion self to be One: But if it be an *evil & dangerous Method*, as the other *Physicians* of ye Town (to whom we owe great honour & regard) have declared it to be in their Judgment, They have done well to warn the people ag't. running into it: & for my own part I now give the *Gentlemen* my Thanks for the *Resolve* which they have lately published for this end.

The meanwhile I heartily wish Men would treat one another with *decency & charity*, meekness & humility, as becomes fallible Creatures & hearty friends to one another & to their Country; that so our prayers may be more united in this Day of common distress to ye. God of our *Health*, who is ye. *God of love & peace.*

Postscript

As to the *Case of Conscience* referred to the *Divines* in the *Letter* wch I have been Animadverting on, I suppose there never was the like put before to *any.* Wt. *heathens* must they be to whom *this* can be a question. *Whether the trusting more the extra groundless Machinations of men than our Preserver in the ordinary course of Nature, may be consistent with that Devotion & Subjection we owe to the Alwise Providence of God almighty*, who knows not the profanity & impiety of trusting in Men or Means more than in GOD; be they the most learned men, or ye most proper means? But I will suppose *Men of piety & learning* too, (for Instance Such as Dr. *Mather* & Mr. *Webb*, who are opposite *Names* in the present case) after much curious Tho't come into an opinion of the Safety of the saulted method of *Inoculating* the *Smal Pox;* & being persuaded yt. it may be a means of preserving a multitude of lives, they accept it with all Thankfulness & Joy as the gracious Discovery of a kind *Providence* to Mankind for that end; And then I ask—cannot they give into the method or practice without having *their Devotion & Subjection to ye all-wise Providence of GOD Almighty call'd in question?* Must they needs *trust more in men than in their* Great *Preserver* in the use of *this* means than in using other means? What wild kind of *Supposition* is this? Do we not in the use of any Means depend on GOD's blessing? & *live* by that alone? & can't a devout heart depend on GOD in the use of *this* means, with infinite gratitude, being in the full Esteem thereof? What hand or art of *Man* is there in this Operation, more than in bleeding, blistering, & a score more things in *Medical use*, which are all well consistent with a *humble Trust in our great Preserver, & a due Subjection to his all-wise Providence?*

Benjamin Colman.

Boston, July, 25, 1721.

HENRY NEWELL MARTIN,

*Professor of Biology in Johns Hopkins University, 1876-1893.**

By Henry Sewall, M. D., Denver, Col.

e name I wish to introduce to you is that of Henry Newell in, M. A., M. D., D. Sc., F. R. S., Professor of Biology ıns Hopkins University from its foundation in 1876 to the of his resignation in 1893, a period of seventeen years. ıy fairly be inquired why, with the exhaustless material r disposal, I have settled on this one life for exposition. Iartin never for one moment was included by any who him within that eerie group possessing attributes we ıinate "genius." He was simply an upright, high- ·d man with human foibles; he had sound common sense and much tact at his disposal. He possessed no very extraordinary talent or learning. Trained under Sharpey and Huxley and Michael Foster, the truths of nature were the canons of his religion and this education was not only assimilated in the development of his own character but was through him an efficient epoch-making force in the scientific development of our country. It is, I think, worth while enquiring how a young man entering at the age of twenty-eight, without the foundation of experience, upon an academic position whose ideals from the outset departed radically from any that had been hitherto aimed at in the pedagogic history of America,

---

ad before the Denver Medical-History Club, Feb. 16, 1911.

had, as I believe, come to deserve the foremost niche in the temple of American physiology which, I venture to hold, is the fountain head of American medicine. In 1876 there was no real profession of either physiology or pathology in the United States. Ambitious young medical graduates got their first hold on medical faculties by undertaking the instruction of students in the perfunctory study of the merely tolerated, if not despised, unpractical or "scientific" bases of clinical diagnosis and treatment—physiology and pathology. Splendid and brilliant men there were scattered about the country and associated with institutions of learning, medical and academic, but their pedagogic relations were limited to the teaching of students. In those days knowledge in America was chiefly founded on authority, not on individual research. True enough, certain original spirits, like Weir Mitchell, H. C. Wood, O. W. Holmes, the Bowditches and many others known to fame, broke through the restraints of convention and lifted here and there a torch to inflame the mind. But the prosecution of original research requires a devoted union of aggressiveness, patience, courage and self-denial which rarely thrives in isolation. It must be surmised that in those days and long preceding, countless pregnant thoughts had sprung up in fertile minds to bloom and fade and die without bearing fruit.

What the Johns Hopkins University did for science and what its Biological Departments did for Medicine was to offer a culture medium and an incubator for scientific ambitions and ideas. Here young men were invited to study and engage in original research under the direction of those who themselves were skilled investigators and amid the stimulating companionship of contemporaries whose talents had already marked them as leaders for the future.

The progress of biological science and art for the past quarter century in this country has sufficiently attested the extraordinary potential energy of the conceptions put in operation at the Johns Hopkins University in 1876. Today there is an American medical science which in my opinion has been made possible only through that massed play of endeavor which in another field Napoleon used to win his victories and a conception of which led Bismarck to make a nation out of futile single states. In short, to employ the vernacular, Newell Martin was the pioneer professional coach in scientific medical team work in America.

Let it be noted that I use the word "Medical" in its profound, most modern significance as that which indicates a conception of vital processes *per se* and which takes it altogether away from that narrow view whose vista was limited by a pill and bound on either side by a saw and an amputating knife. In Martin's time the leaders of thought in physiology felt themselves confronted with a calamity which endangered the autonomy of their science. Physiology in this country did not exist as a profession. Its reason for existence in the mind of even the educated public rested on its relation to medical instruction and it held somewhat the same position in the technical curriculum as grammar does in the academic course. Martin, following the lead of his scientific forebears, insisted that physiology should be regarded as the benefactor handmaid of Medicine and that it should be cultivated pure science absolutely independent of any so-called affiliation. Possibly this question has not yet burned out and certainly it is not expedient here to rake the but I must vent the impression that the course of has ordered it that whereas physiology was then the runt of the medical family it is today the eldest son in a system of primogeniture. As with a noble jewel whose depends upon the cutting, we may name one facet another Pharmacology, another Bio-chemistry, another chology, and so on, the jewel itself remains and ever Physiology.

I will quote bodily from an obituary notice of Martin tributed by Sir Michael Foster to Volume 60 of the *ings of the Royal Society.* It is as follows:

> **Henry Newell Martin was born on July 1, 1848, at County Down, Ireland. He was the eldest of a family of his father being at the time a Congregational minister. afterwards becoming a schoolmaster. Both his parents Irish, his father coming from the South of Ireland and mother from the North. He received his early education at home, for though he went to several schools, his stay was long at any one of them. Having matriculated at the of London before he was fully sixteen years of age (an as to age being made in his favor), he became apprentice McDonagh, in the Hampstead Road, London, in the of University College, on the understanding that the ance of the services which might be required of him as prentice should not prevent his attending the teaching Medical School of the College and the practice in the During his career at University College he greatly himself, taking several medals and prizes, in spite of his for study being, on account of the above-mentioned duties than that of his fellow students. In 1870 he obtained a ship at Christ's College, Cambridge; he had in the that year conducted at Cambridge a class of Histology for late Sir G. Humphrey. The writer of this notice had at the same time been appointed Prælector of Physiology at College, and the two went up to Cambridge together in October of that year. He at once undertook to act as the strator of the Trinity Prælector, whose right hand he to be in every way during the whole of his stay at His energy and talents, and especially his personal qualities much to advance and render popular the then growing Natural Science in the University.**
>
> **At that time there was, perhaps, a tendency on the part undergraduate to depreciate natural and, especially, science and to regard it as something not quite Martin by his bright ways won among his fellows his line of study, and showed them, by entering into all pursuits (he became, for instance, President of the Union Captain of the Volunteers) that the Natural Science student in no respect inferior to the others. In Cambridge, as in his career was distinguished. He gained the first place in Natural Science Tripos in 1873, the second place being Francis M. Balfour. At that time the position in the was determined by the aggregate of marks in all subjects. at Cambridge he took the B. Sc., and M. B., London, the former the scholarship in Zoölogy. He proceeded later D. Sc., being the first to take that degree in Physiology. as, or even before, he had taken his degree, he began to some time to research, though that time, owing to the**

paper on the Structure of the
actory Membrane which appeared in the Journal of Anatomy
l Physiology for 1873. In the summer of 1874 he assisted the
nity Prælector in introducing into Cambridge the course of
nentary Biology, which the late Professor Huxley had initi-
d at the Royal College of Science during the preceding year.
subsequently acted as Assistant in the same course to Pro-
sor Huxley himself. One result of this was that he prepared,
ler Huxley's supervision, a text-book of the course, which
ler their names, appeared with the title Practical Biology and
ch has since been so largely used. In 1874 he was made
low of his College, and giving himself up with enthusiasm to
development of natural and especially of biologic science at
University, was looking forward to a Scientific career in
gland, if not at Cambridge. About that time, however, the
ns Hopkins University at Baltimore was being established,
such was the impression made by Martin upon those with
om he came in contact, among others, Dr. Gilman of Balti-
e, that in 1876 he was invited to become the first occupant of
Chair of Biology which had been founded in the Johns
kins University.

lartin married in 1879 Mrs. Pegram, the widow of an officer in
Confederate Army, but there was no issue, and in 1892 his
e died. Even before his wife's death his health had begun to
way, and after that he became so increasingly unfitted for
duties, which his own previous exertions had raised to a very
at importance, that in 1893 he resigned his post. After his
gnation he returned to this country, for he had never become
American citizen, and was looking forward to being able,
improved health, to labor in physiological investigations,
er at his old University or elsewhere in England. But it was
to be. Though he seemed at times to be improving, he had
e than one severe attack of illness and never regained suffi-
t strength to set really to work. During the past summer
visibly failed, and while he was striving to recover his
ngth by a stay in the quiet dales of Yorkshire, a sudden
orrhage carried him off on October 27, at Burley-in-Wharfe-
, Yorkshire.

do not fear to make my sketch redundant by quotation of
r less formal words of the same writer. When in Septem-
1900, on his return journey after delivering the course
ane lectures in San Francisco, Sir Michael Foster stopped
a few days in Denver, and the Medical Department of
University of Denver enjoyed the unique privilege of hear-
from his own lips an extemporaneous and colloquial review
en and events as recalled from his own scientific career.
ve ventured to insist at the outset of this narrative that
establishment of physiology as a profession in the United
es was due chiefly to the stimulus given to physiological
rch and diffusion of physiological instruction by Professor
in at the Johns Hopkins. And as Martin's knowledge,
ods and inspiration were all developed in England it will
teresting to get a glimpse of the status of physiology in
country just antecedent to the time of which I write.
uote from Foster's Denver address:*

> rpey was the only man at that time (1850) who devoted his
> life to physiology. In all the other schools physiology was
> t by practicing physicians and surgeons. . . . . Now Sharpey
> at the time I am speaking of the greatest physiologist in
> nd, the only person who devoted his whole time to science, had no physiological laboratory. He had no physiological apparatus whatever. All he did in the way of practical teaching at that time was to show us under the microscope preparations of the various tissues. There was no attempt whatever at any practical teaching of physiology. I remember very well when he was lecturing on blood pressure, and was describing to us the then new results of Ludwig, endeavoring to explain to us the blood pressure curve, all he had to help him was his cylinder hat, which he put upon the lecture table before him and with his finger traced upon the hat the course of the curve. That was the way that physiology was taught by Sharpey in England in 1854. . . . . Nobody else in England then was teaching physiology as Sharpey taught it and, as I tell you, he used his hat, and a very old hat it was, as a kymographion for blood pressure. I very well remember going to him one day after his lecture, in which he had been speaking of the functions of the liver (by that time he had recognized that I had a special interest in physiology), and he said to me: "Well," he said, "I didn't like to say anything about it in my lecture, but Claude Bernard in Paris has just sent me a paper which he has read before the Academy of Sciences at Paris and in that paper he has proved that there is present in the liver a substance resembling starch, which is easily converted into sugar."

Foster then stated that, having taken his qualifications, he practiced medicine in the country for six years but was then called back to London to teach practical physiology in University College where a subordinate lectureship in that subject had been established under the influence of Sharpey.

> That was in the early sixties, in about sixty-four or sixty-five. But what could be done then was very, very little. I had a very small room. I had a few microscopes. But I began to carry out the instruction in a more systematic manner than had been done before. For instance, I made the men prepare the tissues for themselves. That was a new thing in histology. And I also made them do for themselves simple experiments on muscles and nerves and other tissues on live animals. That, I may say, was the beginning of the teaching of practical physiology in England. . . . . These lectures on physiology were absolutely voluntary, and only the better students were willing to give up the time needed to get a more thorough grasp of physiology. Well, I appointed a time to see the few who wished to spend some time in this new study, this study of luxury, and there came to me a boy nothing more than a boy, who said: "I am very sorry, sir; I should like to take your course if I could, but you see my parents are not very well off, and I get my board and lodging by living with a doctor close by. . . . . I have, in return for my board, to dispense all the doctor's medicines, and that dispensing takes me from two to five; now your lectures begin at four. I cannot come for the first hour; I will work hard and will try to make up the lost time." I said "certainly, certainly." So he came in, came in regularly late. He came in regularly at five o'clock, and he worked with such purpose that in the examination which I had at the end of the course I awarded him the prize. Well, his name was Henry Newell Martin, and I was so much struck with him that I asked him to assist me in my course, and he became my demonstrator. After we had been at University College together I think two or three years, Martin carrying on his studies and at the same time helping me, he came one day to me in great trouble because he could not make up his mind. He obtained what they call a scholarship at Christ College at Cambridge and he could not make up his mind to accept it and go there. He said he didn't want to leave me. But I was able to tell him what nobody else knew at that time, that in the October in which his scholarship would take him to

---

d. *Colorado Medical Journal*, Oct., 1900.

Cambridge I was going to Cambridge too, having been invited to lecture there. . . . And after a career of considerable brilliancy of some years at Cambridge there came to him an invitation to the Johns Hopkins University at Baltimore. So if I have done nothing more, at all events I sent Henry Newell Martin to America.

It was one of those chances which determine the course of human life by which it happened that the writer of this article, a native of Baltimore, graduated at the age of twenty-one from a New England College some three months before the inauguration of Johns Hopkins University. Through the kindly offices of that sweet and gentle character, Dr. James Carey Thomas, a member of the original Board of Trustees of the University, an introduction was secured to Professor Martin, whose sufficient distinction it was to have been an associate of Huxley, that grand Napoleon of biologic science, who had already enthralled the youth of two continents. I called on Professor Martin at his rooms and my spirits were lightened when I saw a very young man, he was then twenty-eight and looked younger, who treated me at once something like a companion. He was scarcely of medium height, of slight but well-developed frame. His head was rather small, the eyes blue and wide open, nose thin and fine, complexion fair and mustache blond. His dress was always strikingly neat without being foppish. I cannot but fancy that Martin then was homesick and keen to relish the devotion of one not far from his own age. Martin accepted me as his assistant in the biological laboratory at a stipend of $250 for the first six months. Not for many months did I suspect that this was at first a private and not a University appointment.

Martin's ability as a teacher is attested by the eminence of many pupils; his talent as an investigator is recorded in the literature of physiology; but the personality of the man, the kindly tact, the sincerity, the loyalty to truth and the indefinable emanation that reaches from man to man, the memory of these is apt to fail with the heartbeats of his companions. I well remember the first week of preparation for class work. There was as yet no laboratory "Diener" and a hundred tasks of household preparation were to be completed in advance. Martin was kinder than he could have known when he stood beside his assistant washing bottles for reagents; and in this, as in every other field, what would have sorely hurt as a menial service he turned into the routine of technical manipulation.

While he never gave way to sentimentality, his invariable kindliness where he had bestowed confidence withstood every strain of daily intercourse. On one occasion he loaned me overnight the manuscript of an important public address which was to be published. Next morning the roll was missing and apparently lost beyond repair, but the delinquent was the only one ruffled by the accident. To his great joy the papers were found to have been left on the counter of a friendly shopkeeper. For one of his public lectures before a fashionable, and chiefly feminine, audience plans had been devised for the demonstration on the projection screen of familiar physiological activities such as muscular contraction, reflex action and the heart beat in the frog. [illegible] business was to prepare the tissues and make them work. Unfortunately the apparatus was not for proper rehearsal and when the fateful hour nerves and muscles rebelled at the "lime light." would graphically describe a function and then call for stration. Again and again I failed him and things perate, when he asked in the gloom of turned down with accents between a sob and a groan, "Sewall, is your going?" Humiliation was relieved by the titter that the humor of that fair audience.

A lecturer might well feel murderous towards an who so failed him, but if Martin felt that way he gave

Leading women of that day seemed more interested eral culture than in politics. For a considerable period made weekly visits to New York to talk biology woman's club of exclusive personnel. In this and not only was scientific instruction of the right sort diffused but individual sympathy with scientific methods was infused into social and civic leaders of communities. It may easily be surmised that the noying agitation against animal experimentation at least the co-operation of the sane and truthful society were scientific teachers generally in the habit parting by *viva voce* methods and colloquial technical thoughts and aims.

One marvels at the wisdom of those early directors University policy. No effort was spared, apparently, to uplift and fulfill the higher ambitions of the people of more. This people of peculiar sensitiveness, with potential power, could have easily been irritated into an onistic force against the infant university. But even the doors were opened and beginning with the public address by Professor Huxley, the people of Baltimore taught that this institution was primarily for them and children. They were made to feel at home in its lecture its class rooms and its laboratories. In this social fellowship between the University and the community fessor Martin took a leading part. Endowed with stinct and a cultivated *savoir faire* he was welcomed exclusive social circles of the community and early warm friends in the admirable upper stratum of the profession of the city. Not until many years after medical school of the University opened, and I cannot but that the preliminary moulding of local medical by Martin was a powerful stimulus to that valuable and co-operation given by the best element of the profession medical school in its early days. The University of was at that time in fact and tradition the only medical in Baltimore. Curiously enough, since the establishment the Johns Hopkins medical department with its standards, the medical schools of the city have the number of eight, few of which have attained endorsed by the investigating committee of the Carnegie dation. Though Martin's special training had been in physiology the title of his position was that of Biology and the first course offered in the laboratory

The personnel of the first class was drawn
ly from the more ambitious students of the University of
land and younger graduates of that school. The precious
ence of those early days of halting development is attested
he careers of many who there first tested the exultant
lom of scientific thought. Councilman was one of those
ls and often has he eagerly acknowledged his debt to
tin for kindling and shaping his early ambitions. There
er laboriously laid the foundation for the admirable work
ter did. Rivers, now of Denver, was in that earliest class.
r, Sternberg, just winning his spurs in bacteriology, was
ially given the run of the laboratory and there developed
of the essential researches on which his scientific repu-
n rests. And, incidentally, it may be remarked that, in
elief, the vast uplift which the medical and hygienic stand-
of the government medical service has witnessed in the
quarter century has been chiefly due to the influence of
biological departments of the Johns Hopkins University,
through the stimulus given by Martin and later by the
ious association enjoyed by workers with Welch. There
illustrated the very ideal of pedagogy in which the soul of
teacher combined with the soul of the pupil and charged
ith a force which irresistibly impelled to the search for
lation in Nature. It may well be doubted whether without
teaching there would have been as we know them in person
memory, a Reed, a Carroll, a Gorgas or a Lazear. With-
his teaching it is probable that yellow fever would have re-
ed a mysterious miasm and the attempt to trench the
inent at Panama would have been a disastrous failure.

the second or third year of the laboratory young men
from college, and with vastly better preliminary train-
than those from the medical school, began to seek post-
uate instruction. Among these one quiet boy, by virtue of
lear judgment and competent grasp of the problems pre-
d, soon became singled out from the rest of the class as
boon to the teacher, a sort of intellectual reagent by which
fficiency of the instruction might be tested. None of us
ned that this lad, W. H. Howell, was in training to take
e task which Martin was to relinquish and to keep the
ological laboratory of Johns Hopkins in the forefront of
riendly rivals for whose existence it was largely re-
ible.

oking back over the history of those days one must marvel
e felicity with which Martin made and then developed
tunities in the unbroken field before him. Courses in
ical biology and practical physiology formed the routine
oratory work. But soon there were established accessory
s in demonstration and practice. A selected number of
achers of Baltimore were offered a course of study on
day mornings. Listening first to a brief descriptive
e by the professor, they then adjourned to the laboratory
ith their own hands and eyes carried on for two or three
such a nature study as had not been conceived in those
It was a duty of the writer to prepare material for that time of the preceding week. The physicians of the community were invited to a course of physiological demonstrations and many eagerly availed themselves of the opportunity. Martin's unselfish and impelling nature sought the utmost development of all about him. The present writer had no sooner attained a defensible grasp of histological material and technique than he was induced to offer a private course in histology to medical students and was allowed to retain the fees therefor.

Martin soon came to be looked upon as the scientific exponent of the medical profession and through lectures and practical demonstrations he illuminated the minds and raised the ideals of the more ambitious members of the cult. With infinite tact he made abstruse subjects so plain and practical that his hearers often volunteered as real students and helpers. He beguiled a medical audience into a feeling of familiarity with profound subjects and at the end the listeners had actually acquired something.

W. K. Brooks was originally appointed Fellow in the Department of Biology, but at the outset it became apparent that his acquirements and capacity were preeminent and he gradually took over the distinctly zoölogical side of the instruction. Brooks was one of the very few men I have known who seemed to me to be born philosophers. What I understand to be the philosophic method was to him not like a suit of clothes to be left in the class room but was his very skin and indispensable. His viewpoint of all phenomena was such as one might imagine actuated the Genius of Nature itself. A fireside talk with him was almost an intellectual carousal but, withal, leaving one fresher and better satisfied.

After we had been going some four years, the writer having moved on to a Fellowship and then to the post of Associate in Biology, W. T. Sedgwick, newly from Yale, was put in charge of practical instruction. We made a most harmonious team. He confided to me at the outset that he didn't know anything about the subject. I confessed to being in much the same fix but that we wouldn't say anything about it. Sedgwick was gifted with that precious influence, which is the most valuable faculty of the physician in the sick room, the power of diffusing confidence. His calm, critical yet kindly partnership was distinctly to the good of the department. I can hardly doubt that in return, the training he received in Baltimore was the corner stone to that brilliant career upon which he was soon to enter at the Massachusetts Institute of Technology.

Most teachers, perhaps, on leaving the class room or laboratory are glad to shun the faces that duty makes familiar throughout the day, but Professor Martin after his marriage invited pupils to a weekly informal conference at his home where with his talented wife he supplemented the impersonal relations of the laboratory with the ties of social intercourse. The high grade associations which Martin had enjoyed, especially at Cambridge, no less put their stamp on his character than did the unique training in nature study under Huxley and Foster direct the current of his abilities. The absolute unselfish singleness of purpose of the man to seek the truth in Nature and to be honest with his friends shone clear in every act, though he refrained from ostensibly preaching ethics. We hedge round with a wall of respect the slender group of those who have no private working legend, "What is there in it for me?"

No adequate estimate of the specific educational forces at work in the late seventies can fail to take into account the influence on the youth of that period of the intellectual atmosphere emanating from the doctrine of evolution. The "Descent of Man" appeared in 1871 and soon a strife was on between a protesting and enraged orthodoxy on the one hand and the, often iconoclastic, forces of thought-liberty on the other. Professor Huxley, known affectionately by those near him as the "General," as the commander of a ship is dubbed "the old man," was the splendid and aggressive leader of the Anglo-Saxon believers in evolution. It is not surprising that the internal tempest bred by thoughts of the supernatural in the mind of every thinking youth should have often found its outlet along the channels of reason as suggested by evolution when intolerant of the traditions of mysticism. To be frank, the popular notion that the prevailing spirit of the Johns Hopkins staff in those days, at least as regards the biological department, was "agnostic" was sufficiently correct. A corollary to this attitude could not but occur to me when, with something like a shock, I once heard Martin say in effect, "I am thirty years old today and am ready to quit; have had enough." The corollary is that something more than nature study is necessary to satisfy some of the affinities of man.

To my mind the most useful teaching of Martin's career is found in an analysis of the elements of his success. It was clear in his case, as has often been established in others, that his success depended on careful preparation for every effort made. I was very much impressed when, after two years special study of gastric digestion and he had appointed me to make my maiden lecture on the subject, he asked me a full month before the time whether I had prepared my lecture yet. The thought sprang to mind "It may be that this ultra-preparedness has something to do with Martin's success."

Again, once when we were giving parallel courses to the same class, he in the morning and I in the afternoon, he one day evidently ran out of prepared material and to my horror, being one of the audience, he deliberately appropriated the most harmonious thunder I had laboriously stored for the afternoon. I hastened to privately reproach him on the subject but he only replied "It doesn't matter; it will do them more good to hear it a second time." This reminds one of the summing up which a great teacher, Michael Foster, I think, made of his pedagogic experience: "Every year I put less into my lectures and say it over oftener." I can recall but two personal criticisms Martin ever made to me, one was because of a tendency to neglect to expound familiar and obvious details in making a physiological demonstration and the other was for a proneness to proc[illegible] the preparation for a remote exposition. Martin [illegible] 1880 to write an excellent textbook of physiology, "The Human Body," which became very popu colleges; and in a short time a separate, condensed ed "The Briefer Course," was prepared for use in seco schools.

Nothing that I have said predicates for the Johns H University or its biological department a position of pe preeminence among American institutions of learning. I is now a matter of history that to the University wa ceded a unique position as an educational leader almost the opening of its doors. With phenomenal wisdom th ministrators of the University chose for the heads of it partments men who were not merely good lecturers but investigators and sources of inspiration in their resp fields. The three departments of natural science estab were all under the direction of men still far short of m age. In those days the young men gathered there wer votaries of what Huxley called "the divine dipsoman original research." Of inexpressible value to us, ofte informed but earnest students, were the precepts an amples of leaders trained in the ways of making know Martin's achievements inculcated the encouraging lesson the prime requisite of a successful investigator is not "ge or even great talent, but above all, a faithful, unerring satiable desire for Truth as a point of view; to which mu added a working energy of indomitable persistence and g by a faith that nothing happens without a reason.

Martin was not a voluminous writer. In his seventeen of service in Baltimore there were produced by him but papers covering the results of original researches. Some work that Martin accomplished was truly epoch-making reason of the fact that it led to methods which have been fruitful in physiological discovery. Yet Martin's nam seldom mentioned in the literature thereof. Verily, in sc as in commercial life, the promoter is not without a fu to him who would reap from his sowing. Martin knew ing of mathematics, yet his clear mind grasped the essen mathematical method of dealing with the complex pro of biology; for he realized the necessity of attacking phenomena not *in toto,* as the clinical observer is forced but through a study of the separate variables which co to produce them. He frequently said, "We know a good about the skeletal muscle because we can isolate it and frog's heart for the same reason," and his mind evi kept in view the importance of studying the various functions in disassociated organs.

I very well remember one morning, I think it was in Fall of 1880, Martin said to me, in effect, "I could not last night and the thought came to me that the problem lating the mammalian heart might be solved by getti return circulation through the coronary vessels." The seemed reasonable and at the close of the day's work w æsthetized a dog, prepared him for artificial respirati then Professor Martin opened the chest and ligatured one the venæ cavæ and the aorta in such a way as to sufficient amount of blood in the heart itself. The hear

-g from the right side, through the lungs to the left de and back through the coronary vessels in the heart wall to ıe right auricle again. Thus heart and lungs were completely olated from the rest of the body and could be studied un-fected by the interference of factors foreign to itself. Mar-n grasped the full significance of his discovery and elaborated ith infinite patience the practical details involved in sub-itting the isolated organ to experimental conditions. It was ought necessary to furnish the heart with an artificial supply ' blood and accordingly defibrinated calf's blood was used ıd fed to the heart from a Mariotte's flask. The body of the ɔg and all the materials used in the experiment were inclosed ithin a glass walled hood of ample dimensions movable by pes and pulleys over a shallow pan of zinc in which water ıs kept heated at a body temperature. In such an apparatus e isolated heart could be kept beating in a fairly normal shion for upwards of five hours. The prosecution of such an periment was exhausting to body and mind, yet for several ars Martin lost no opportunity to press his work to a finish. othing could be a surer index of the clarity of mind in this vestigator than the simple and fundamental data he sought establish by his new method. We find his first paper en-tled, "The Influence on the Pulse Rate of Variations of rterial Pressure, of Venous Pressure and of Temperature." gain we have "The Direct Influence of Gradual Variations Temperature upon the Rate of Beat of the Dog's Heart." lso, "The Action of Ethyl Alcohol upon the Dog's Heart," ıd so on through a series of some nine researches.* The per upon the effect of temperature upon the heart beat was e subject of the Croonian lecture for 1883, and about this ne the author was elected Fellow of the Royal Society.

The great strides which have been made towards a complete owledge of cardiac physiology and, as an outcome, of clinical made along the path first cleared by Martin. It was not until 1895, fourteen years after Martin's discovery, that Langendorff introduced his admirable and simple method of sustaining the isolated heart by a nutrient stream directed into the coronary vessels alone through a canula tied in the stump of the aorta. It seems little to the credit of physiologists that so long a time should have elapsed before so obvious a modification of Martin's procedure should have suggested itself. Isolation of the mammalian heart by the "Method of Langendorff" is now a common laboratory procedure. Probably few are aware of the real discoverer of the idea.

It is interesting to note the character of the problems with which Martin busied himself, and his persistent search for an *experimentum crucis*. Assisted by Sedgwick he apparently settled experimentally the disputed function of the internal intercostal muscles. They also succeeded in putting a canula in a coronary artery of the living dog's heart and directly measuring the blood pressure and pulse wave in the coronary system, though the great Cohnheim had laid down the dictum that occlusion of a main coronary artery was immediately fatal to the physiological action of the heart.

When one considers the prevision manifested in these researches of a quarter century back one cannot but deplore the loss to science of Martin's mind and wonder whether, with the richer material facts and profounder views of their meaning now current, he might not, if living today, be the acknowledged master in his chosen field. Perhaps, after all, it is only another of Nature's compensations that the story of life should be prone to end in anticlimax. It makes it easier to close the book. Failing in health and energy of application for some years, Martin resigned his professorship in 1893, at an age when he should have been in his prime—45 years. In a letter to me written from a sick room at that time his thought was all for the destiny of that Pure Physiology which he had labored so faithfully to nurture on American soil.

---

* Vid. Memorial Volume, "Physiological Papers," by H. Newell ırtin. The Johns Hopkins Press, 1895.

EDICAL NOTES ON THE DIVINE COMEDY OF DANTE ALIGHIERI.*

By P. H. Dernehl, M. D., Milwaukee, Wisconsin.

As a physician one cannot, in reading the Divine Comedy, ape being attracted by the frequent medical allusions it ıtains. It may appear of subordinate interest to attempt draw from and present by itself its medical lore, and per-ɔs also imprudent in a physician to express an opinion on ntean questions which in truth fall not within his sphere. ɘ latter is in no wise my purpose. I have endeavored merely to present in collected form, making no pretense at completeness, such references as I believed might prove of interest in portraying something of the state of medical science in Dante's age and as might serve to shed some light upon his knowledge of medicine. I trust this may have been to no idle purpose.

To secure a finished picture of medicine, especially of ancient and medieval medicine, we are pressed to call upon the historian, philosopher and poet to supply that which the purely medical writers have withheld from us. Thus Homer reveals a wealth of medical information in the Iliad and Odyssey. Plato, the philosopher, wrote also of medical problems. To the historian, Thucydides, we owe the best account we possess of the plague of Athens. The medicine in Shakespeare has been made a subject by many writers. Molière has preserved for us

---

All the quotations are taken from Longfellow's translation of Divine Comedy. I have given it preference over the many ers, first, because of the English translations, I believe it ɔe the one with which the American reader is most familiar, , second, because, accepting the opinion of those best quali-to judge, his version is recognized as among the best in tongue, and the most faithful and scholarly which the ;lish language possesses.

phases of the medical life of the seventeenth century. How frequently we find in accounts of the plague of England (1663-65) quotations, describing its ravages, taken from Pepys' Diary. Choosing at random from among more recent writers, let us select George Eliot, who in Middlemarch, seeks to incorporate in Doctor Lydgate the struggles and aspirations of the profession in the nineteenth century, and Oliver Wendell Holmes, in whose purely literary writings, we are given so much of interest and worth drawn from a physician's daily life in his community. But where today can we find the old family doctor he depicts? We would seek in vain through the medical journals for an account of him. In like manner the Divine Comedy—the Mirror of the Middle Ages, as it has been termed—reveals much of medical interest, which deserves recognition, the more so because the medical literature of the Dantean period leaves much to be desired.

The Divine Comedy is an expression of all that the great genius of Dante was master. It is more than a medieval comprehension of dreams of the hereafter, abounding with legends and visions of the world to come. It is the one epic which embodies as no other has done the past and present, time and eternity. One cannot read it carefully without observing how closely, almost exclusively, Dante fixes his observation on human nature. Humanity itself with its faith and erudition, with its presentiments, with its joys and sorrows, peace and repose, with its strifes and toils, and with its virtues and vices is the fertile source of his theme. For that vast gathering of spirits which is introduced to discourse on such varied topics we glean that which the Divine Comedy contains of medical interest. What it portrays of medicine is as Dante and his time knew it.

Whether, if at all, Dante was schooled in the science of medicine remains conjecture. The opinions of his numerous commentators are at variance regarding this, and Dante in his writings has left no positive evidence. The consensus of opinion among his commentators appears to be that in large part his learning was acquired autodidactically and that later in life his eagerness for the acquisition of knowledge led him to pursue university study. His early training was gained in the schools of Florence. In these were taught the trivium and quadrivium, the first including grammar, logic and rhetoric; the second, music, arithmetic, geometry and astronomy. Among the universities, Padua, Bologna, Paris and even Oxford are accredited with having had him enrolled. Be that as it may, we are in total darkness whether or not while in attendance at any one of these institutions, Dante devoted any of his time to the study of medicine. We know that in 1297 he enrolled himself in the guild of physicians and apothecaries, being there qualified with the title "*Poeta.*" His enrolling as a member of a guild was probably done as a necessary preliminary requisite to his entering upon active politics. But why choose the mentioned guild in preference to others? Because among his ancestors were druggists; because Dante intended eventually to pursue medicine as a calling; because apothecaries, in his time, dealt also in books, and Dante was a lover of these; because to this guild belonged also artists, and Dante was a lover of art. These and other reasons are sented on the list of choice.

The "Guild of Doctors and Apothecaries of Florence" incorporated in the twelfth century. It grew rapidly in portance during the thirteenth and fourteenth centuries, soon became a very important power in the republi Florence.

A statute applying to the physicians lays down that, doctor may be allowed to practice unless he has first been licly examined by the consuls of the guild." To apply a apothecary imposed no examination, as it did for a doctor, required merely registration. Those engaged in the ma and selling of books and other literary matter were me of this guild; so too the painters and engravers. The then that Dante enrolled as a member of this guild cannot be taken as evidence that he devoted himself to the stud medicine in order to qualify as a member. We are told b less an authority and student of Dante than Kraus, that D knew medicine and practiced it as a means of support in exile. Lowell tells us that "to the trivium and quadri Dante afterward added painting, theology and medic Whether or not Dante was versed or trained in medicine fact remains that he did not write as a physician. In atte ing to interpret his medical references in the Divine Co it is often difficult to discriminate between what shall or not be regarded as such. A liberal interpretation must in many things, that are but the expression of a common k ledge held by all men of his time. For a better understand of what the Divine Comedy contains of medical intere may not be amiss to recall briefly the state of affairs which medicine labored in the thirteenth and fourte centuries.

All medicine during this period was held fast by the ba the inexorable idolatry of Galen, and, as did all learnin this period, suffered heavily under clerical, feudal and sch tic conceits. Under the oppression of a ruling despotism mystical tendencies, a spirit of individual research could flourish, and the men of medicine were known less by the of their works than by their love for instructing and the they displayed in the propagation of such knowledge as had borrowed from the ancients. However, the Arabic sions of Greek medicine had been rendered into Latin fro books of Rhazes, Albucasis, Avicenna and others, and gave a worthy impulse to medical progress. The schoo Salerno, Bologna, Padua, Montpellier and Paris, as libera stitutions of learning, had reached and were advancing reputable height. But philosophy which was most ard pursued at these institutions held medicine wrapt in its c permitting it to become little more than a philosophical sci It tended on the one hand toward Galenism, on the oth conformed with the Arabic system or again strove along new and untrodden medico-philosophical path. Under heads of these various systems all observations were rec blindly. That conditions such as these could produce but real medical writers worthy to arrest our attention is cl evident. Besides the universities, the cloisters were als selves much with medicine and even gave themselves to practice of surgery, though frequently against the wishes heir superiors. Those who taught medicine at the univer- es and other institutions of learning usually also practiced they did little, however, with surgery, and spent much of r time commentating the works of the ancients. Of the cticing physicians proper, some had an established resi- ce, others traveled from place to place. The former were ally men systematically trained at the universities and were nted the right to practice their art under certain provisions. se being laid down in an edict of Frederick II in 1224, by ue of which no individual in the kingdom who had not been mined previously and created a master by the school of erno could practice. It required that the study of logic, is philosophy and philology, be pursued for three years a course in medicine, including surgery, for five years. student had to furnish a certificate of legitimate birth and attained his twenty-fifth year. He was examined publicly the therapeutics of Galen, the first book of Avicenna and aphorisms of Hippocrates. He could not enter legally into ctice, however, until he had served a year as apprentice to older and experienced physician. Besides these resident icists, there were those who practiced as traveling scholars, g from place to place, often in company with a buffoon or rake, visiting the markets and places of public gathering, ertising their "wares." This species of charlatan played no ll part in the practice of medicine during the whole of the dle Ages. The pure surgeons of the day were obliged to fol- the teachings of a faculty for one year. This period was oted principally to the study of anatomy. Further know- e pertaining to their art they gleaned from a master to m they were apprenticed. They were given the title of *istri chirurgiae* and permitted to practice surgery only. y of these were resident surgeons and members of guilds. rs, as surgeons of the short robe, traveled about perform- often brutally enough, operations for hernias, cutting for e, doing operations upon the eye, among which couching first rank, and always making sure to be out of reach of venger before the result became manifest. Lastly, there the barbers and bathers, the former being privileged to upping and bleeding, extract teeth and set fractures and cations and execute various minor operations and often gh they were guilty of transgressing upon the field of the eons. The bathers, like the barbers, did cupping and ing and gave clysters.

iring this period, too, medical superstition, growing as it ipon a soil so well prepared by vainglorious philosophy by a scholasticism which had usurped all clear human ning, had reached a high stage. Faith in the healing in- ce of certain astrological phenomena was universal, as also elief, heightened by religious fanaticism, that the divine ence could and always did alter and direct the functions body. Belief in the evil workings of the devil, the heal- f the sick by the power of the saints and through relics, ets and gems was in high favor throughout the Middle seventeenth century. Closely associated with these beliefs was that in the magic art and magic medicine. Though condemned by early Christian emperors, its ideas still survived and its methods frequently shade so insensibly into the superstitution, yes, into the religion and philosophy of this period that it often becomes imposible to decide to which of these domains the one or the other belongs.

In the lowest Hell, where punishment for graver sins awaits the doomed, Dante sees among others the workers in the magic art. One of these Virgil points out to him as Michael Scott—

> *** * * who of a verity**
> **Of magical illusions knew the game. (Inf. XX, 116.)**

Scott, astrologer of the Hohenstauffen monarch, Frederick II, deserves our recognition as the supposed translator of Avicenna's commentary on Aristotle's De Animalibus. The workers in magic medicine who are associated with Scott in this Bolgia are referred to as they who

> *** * * wrought their magic spells with herb and image.**
> **(Inf. XX, 123.)**

The belief in the healing power of gems appears to have been strongly influenced by the writings of Michael Psellus (1020-1105), whose book on the therapeutic action of stones is frequently referred to in medieval medical literature. How deeply this belief had taken root we can gather from later medical writers. Cardan and Paracelsus gave space to its promulgation. From Sir Thomas Browne's Vulgar Errors, the sixth edition published in 1672, I quote the following. Browne writes: "That *lapis lazuli* hath in it a purgative faculty we know; that bezoar is antidotal, *lapis judaicus* diuretical, coral anti-epileptical we will not deny. That cornelians, jaspis, heliotropes and bloodstones may be of virtue to those intentions they are employed, experience and visible effects will make us grant. But that an amethyst prevents inebriation; that an emerald will break if worn in copulation; that a diamond laid under a pillow, will betray the incontinency of a wife; that a sapphire is preservative against enchantments; that the fume of an agate will avert a tempest or the wearing of a chrysophrase make one out of love with gold as some have delivered, we are yet, I confess to believe and in that infidelity are likely to end our days."

Dante refers several times to the mystic virtue of gems, recounting the ruby, topaz, heliotrope and sapphire. Led by Beatrice into the Empyrean, its splendor and brightness bereaves Dante of his vision, but with the aid of Beatrice and by the virtue derived of drinking from the waters of the river of light he becomes enabled to see,

> **Both of the Courts of Heaven made manifest. (Par. XXX, 96.)**

> **Out of this river issued living sparks,**
> **And on all sides sank down into the flowers,**
> **Like unto rubies that are set in gold. (Par. XXX, 64.)**

The water of this river, Beatrice informs him, he needs must drink that his sight might comprehend all the gladness of that Heaven. It is safe to assume that Dante's reference to the ruby here rests upon the belief that the ruby powdered and taken in water cured diseases of the eyes.

It was during Dante's time that the veneration paid to the Virgin Mary, in earlier times very great, rose to an almost exclusive idolatry. By prayer her aid was invoked in the cure of all ailments, though her particular virtues in this respect were believed to manifest themselves at the natal hour. It is of interest in this connection to quote from the Calendaria of Cardanus (1505-1576) who by the aid of astrology affirms that in this event the request to the Virgin would be sure to be complied with, if on the first day of April at 8 a. m. a prayer invoking her aid were offered. On the fifth terrace of Purgatory, Dante hears uttered amid the weeping,

> *** * * * * "Sweet Mary!"**
> *** * * * * * * ***
> **Even as a woman doth who is in child-birth.** (Purg. XX, 19.)

In Paradise the spirit of his ancestor Cacciaguida recites of the beauty and simplicity of Florentine customs in his day and adds to such a beautiful life,

> **Did Mary give me, with loud cries invoked.** (Par. XV, 133.)

The same spirit relating of his birth, says of this,

> **From uttering of the *Ave*, till the birth**
> **In which my mother, who is now a saint,**
> **Of me was lightened who had been her burden.** (Par. XVI, 34.)

As mentioned, faith in the medical virtues of the saints and the evil doings of the devil was markedly manifest during the Middle Ages and was shared by all classes. As late as the seventeenth century we find traces of this belief still prevalent among many members of the medical profession.

In the pageant of the Church Militant St. Luke is introduced as

> **One showed himself as one of the disciples**
> **Of that supreme Hippocrates, whom nature**
> **Made for the animals she holds most dear.** (Purg. XXIX, 136.)

St. Luke, writer of the Acts of the Apostles, is supposed to have been both an artist and a physician. Whether he was ordained as healer of any one specific sickness or exercised this function at large I have been unable to learn with certainty. In the Inferno the aid rendered Constantine by St. Sylvester in curing him of his leprosy finds expression in

> **But even as Constantine sought out Sylvester**
> **To cure his leprosy * * * *** (Inf. XXVII, 94.)

This probably finds its source in the *Legenda Aurea*, by de Voragine (1230-1298). I have been unable to find anywhere that Sylvester's aid was specially invoked in the cure of leprosy. Under this heading may be added one further reference. In Paradise, Dante is examined by St. John on Christian love. By the refulgent flame of that saint he becomes so dazzled as to be for the moment bereft of his sight. Beatrice, who

> *** * * has in her look**
> **The power the hand of Ananias had.** (Par. XXVI, 12.)

gives Dante back clear vision. It may appear that these references are destitute of medical worth, but in the light of the Middle Ages, the era of miracles, a belief in them was firmly fixed and largely through the contributions and teachings of the clergy. Be it remembered that Paré (1517-159 never able to quite divest himself of his belief in sain monsters. Firmer and more enduring was the belief in agency of the devil, afflicting humanity with disease in various forms. The epidemic of St. Vitus's dance in the teenth century, for instance, was attributed to the evil ings of the devil. Not alone in the creation of disease wer activities made manifest, but as Martin Luther, in accord with the existing belief, seeks to have us believe, the inf spirit was not loath to assume the rights which should be mitted only to the husband: "Es ist wahrlich ein gr schrecklich Exempel dass der Teufel kann die Leute pl dass er auch Kinder zeuget" ("Tischreden"). Among references expressing the evil workings of the devil, the fol ing one serves well to portray this medieval conception:

> **And as he who falls, and knows not how,**
> **By force of demons who to earth, down drag him,**
> **Or other oppilation that binds man,**
> **When he arises and around him looks,**
> **Wholly bewildered by the mighty anguish**
> **Which he has suffered, and in looking sighs.** (Inf. XXIV,

By *"other oppilation,"* I infer with Dr. Carlyle and B venuto that Dante would have us understand the fits epilepsy. This surely is a more likely interpretation than t given by Jeremy Taylor, who believed that by it is mea gout, dropsy or catarrh. The epileptics, and insane in pa ticular, were believed to be the abode of the devil, a belief f propounded by Origenes, and later greatly furthered by church. The treatment, often most inhuman, consisted in prayers, pilgrimages and exorcisms or in the administrat of remedies assumed to contain divine puissance. Thus Pe of Spain († 1277):

> **Who down below in volumnes twelve is shining.** (Par. XII, 13

tells in his *Thesaurus pauperum*, that the charms of the me are discarded by him, but that to keep free from epileps needs but suspend about the neck a piece of paper upon w are written the names of the Saints Caspar, Melchior a Balthasar.

Reaching the tenth gulf of hell, Dante meets the forg and alchemists, who as punishment for their offenses afflicted with diverse plagues and diseases. This gives him o casion to liken the intensity of their affliction to the suffer during the plague of Aegina.

> **I do not think a sadder sight to see**
> **Was in Ægina the whole people sick,**
> **(When was the air so full of pestilence,**
> **The animals, down to the little worm,**
> **All fell, * * * * * ***
> *** * * * * * * *)**
> **Than was it to behold through that dark valley**
> **The spirits languishing in divers heaps.**
> **This on the belly, that upon the back**
> **One of the other lay, and others crawling**
> **Shifted themselves along the dismal road.**
> **We step by step went onward without speech,**
> **Gazing upon and listening to the sick**
> **Who had not strength enough to lift their bodies.**
> (Inf. XXIX,

borrowed from Ovid's account of the plague of Ægina etamorphoses, VII), an excerpt of which from Stonestreet's anslation will prove of interest.

Their black dry tongues are swelled and scarce can move,
And short thick sighs from panting lungs are drove.
They gape for air, with flatt'ring hopes t'abate
Their raging flames, but that augments their heat.
No bed, no covering can the wretches bear,
But, on the ground, exposed to open air,
They lie, and hope to find a pleasing coolness there.
The suff'ring earth, with that oppression curst,
Returns the heat which they imparted first.

* * * * * * *

Here one, with fainting steps, does slowly creep
O'er heaps of dead, and straight augments the heap;
Another, while his strength and tongue prevailed,
Bewails his friend, and falls himself bewailed;
This with imploring look surveys the skies,
The last dear office of his closing eyes,
But finds the Heavens implacable and dies.

the sixteenth Canto of Paradise, Dante deplores the down- ll and degeneracy of Florence and its citizens, a cause for hich he sees in the introduction of families from the neigh- ring countries and villages. He is told by Cacciaguida that,

Ever the intermingling of the people
Has been the source of malady in cities,
As in the body food it surfeits on. (Par. XVI, 67.)

d

To hear how races waste themselves away,
Will seem to thee no novel thing nor hard,
Seeing that even cities have an end. (Par. XVI. 76.)

iese lines have been variously interpreted. Longfellow ites: "Boccaccio seems to have caught something of the irit of this canto, when lamenting the desolation of Florence the plague in 1348." It appears that following the epi- mics of Rome (1167) and that of Venice (1172) there ntinued to occur in Europe at intervals, with more or less atement, outbreaks of a prevailing *pest,* to culminate again that horrible, devastating epidemic, the Black Death, which is estimated depopulated Europe during the three years, 18-1351, of twenty-five million human lives. It is unfortu- te so careful a recorder and acute observer as Dante has left no account of any plague visitation, for it appears con- vable that if not an eye witness he must have had plague rors related to him. The view of Dante that the inter- gling of people is an exciting cause of the spread of diseases cities was expressed by both Plutarch and Thucydides cen- ies before. Thucydides (Jowett's translation) writes of the gue of Athens: "As to its probable origin or the causes ich might or could have produced such a disturbance of na- e, every man, whether a physician or not, will give his own nion. . . . . The crowding of the people out of the country the city aggravated the misery; and the newly arrived suf- d most. For, having no houses of their own, but inhabit- in the height of summer stifling huts, the mortality among n was dreadful and they perished in wild disorder." Plutarch says the people were persuaded, "that the sickness was occasioned by the multitude of out dwellers flocking into the city and a number of people stuffed together in the height of summer in small huts and close cabins where they were forced to live a lazy inactive life, instead of breathing the pure open air to which they had been accustomed."

With the anatomical references in the Divine Comedy must be associated those to physiology, for it was not until the late sixteenth and the seventeenth centuries that physiology was placed upon a pure rational and scientific basis through the labors of such masters as Galileo, Newton and Borelli in physics and in particular through the efforts and discoveries of Harvey, Hales, Magendie, Spallanzani and others of their type, but especially those of Haller, who has been and is still honored with the proud appelation of the father of physiology. The anatomy and physiology in Dante is largely that propounded by Galen. As deserving of notice Galen was the first to apply methods of experimentation and vivisection to physiology (Baas). Unfortunately he so overburdened his teachings of this science with false speculations and visionary conceits that these more than his experimental science left their impress upon the Middle Ages. To enter upon the physiology of Galen would lead beyond the confines of this paper. It, as did all of what was Galen's, exercised a paramount influence over medicine and was most firmly and slavishly adhered to.

For a better interpretation of the medical references that follow a brief outline of the salient points of Galen's physiology or better philosophico-physiological views may not be amiss. Galen believed that in man there are three actuating impulses—namely: spirits, humors and solids. The solids he divided into simple or similar and organic or compound. The former being represented by the bones, flesh, nerves, etc., the latter by the arms, legs, head, etc., because these are formed of the several similar parts. The dynamical forces of the soul or *pneuma* he divides, with Hippocrates and Aristotle, into four primordial qualities: heat, cold, dryness and humidity. These by their individual or united action influence all transformations of the human system. This pneuma vitalizes in the body a natural spirit, located in the liver and renal veins; an animal spirit in the brain and nerves, and a vital spirit in the arteries and heart. Subordinate to these are special faculties of the body that function occasionally, as the attractive, the repulsive, the retentive and the secreting faculties. The natural spirits originating with the veins in the liver proceed from thence with the blood to the heart, to be mixed with air, which that viscus attracts from the lungs, and uniting with it forms the vital spirit. This is then conducted by the arteries to all parts of the system, but chiefly to the brain where it is converted into the animal spirit. By these essences the action of production, nutrition and growth are maintained.

From the general character of Galen's presentation of the distribution of the sanguinary fluids it is a rational conclusion, perhaps, to assume his practical acquaintanceship with the circulation of the blood, but whether, as some medico-historical writers would have us believe, a knowledge of the utility of the venous valves and of the true function of the heart was alone essential to deck him with the laurels that have come to Harvey had better be relegated to the realm of fruitless speculation.

Of more than common interest are the references found in the Divine Comedy relating to the circulatory system. Much stress has been laid upon the fact that Dante speaks of the pulse and distinguishes between veins and arteries, and upon this fact alone several of his commentators have chosen to base, in part at least, the contention that Dante knew medicine, or would infer that he antedated Harvey even. Thus Schlosser in his *Welt Geschichte* writes, "Anatomie und Physiologie [kannte er] besser als man für seine Zeiten denken sollte—Erst durch Harvey wurde nämlich die Lehre vom Blutlauf diesseits der Alpen verbreitet. Dante deutet aber gleich in Anfange seines Gedichts auf Puls und Blutadern hin." The passage to which Schlosser has reference occurs in the first canto of the Inferno. Dante, being driven back from the path he pursued by the she wolf, implores Virgil's protection with

"Do thou protect me from her, famous Sage,
For she doth make my veins and pulses tremble." (Inf. I, 89.)

In recounting the humiliation of Provenzan Salvani, to which he bowed himself, that he might save his friend, the shame of which was so great that

He brought himself to tremble in each vein. (Purg. XI, 138.)

This throbbing of the pulses finds more forcible expression when Dante finds himself deprived of Virgil's guidance in

*** * * * * "Not a drachm**
Of blood remains in me that doth not tremble." (Purg. XXX, 46.)

Whether or not Dante distinguished arterial from venous blood is perhaps given expression to in the ninth canto of Purgatory, where Dante likens the third and uppermost stairs of the gate leading to that Heaven, and which is made of porphyry, to the color of blood—

*** * * as flaming red**
As blood that from a vein is spirting forth. (Purg. IX, 101.)

Lanfranchi († 1315) is said to have been the first to distinguish between arterial and venous hemorrhage. Dante appears to have shared with Galen the belief prevalent also in his own time, that the blood was the seat of life. This is expressed in several passages. The shade of De Vinea tells Dante that the fidelity which he, Frederick's chancellor, bore his master was of such magnitude that he thereby lost his sleep and *pulses* (life) (Inf. XIII, 63). In Purgatory Jacopo del Cassero, reciting his past, speaks of his death from

*** * * * the deep wounds, through which**
Issued the blood wherein I had my seat. (Purg. V, 73.)

In the same book we are told that Christ liberated us with his *veins* (Purg. XXIII, 74).

It is rather striking to note the frequent references Dante makes to vision, its anatomy and physiology. The flashing, dazzling, brilliant lights in Purgatory and Paradise naturally call for expressions indicating the effect on the vision. However, the fact that he was interested in and busied himself with optics, and at one time suffered from severe
trouble, appears to have left a profound impress upon
He speaks of it in the *Convito*, saying that the stars app
to him as seen through a fog, and that he regained his
vision only after a lengthy rest of his eyes in dark and
surroundings and by the application of cold compresses
this may naturally have rendered him more acutely sen
to matters pertaining to vision. The effects of the bright
are well expressed in

Even as a man who gazes, and endeavors
To see the eclipsing of the sun a little,
And, who by seeing sightless doth become,
So I became before that latest fire. (Par. XXV, 118.)

And that condition of the sight which is
In eyes but lately smitten by the sun
Bereft me of my vision some short while. (Purg. XXXII,

We meet with frequent references to squint and are told
as volition moves the eyes, they

Must needs together shut and lift themselves. (Par. XII,

We are told of spirits who carried their chin lifted up
like a blind man. To note the approach of an angel
opens to Virgil and Dante the gates of the city of Dis, V
calls upon Dante to

*** * * * "Direct the nerve**
Of vision now along that ancient foam." (Inf. IX, 73.)

That the optic nerve effected the sight by having the ra
light intercepted and conducted to it by the *spirits* which
found between the lens and choroid was the accepted opi
in Dante's age. In making known to Dante that the dep
spirits know things past and to come but are ignorant
things present, a spirit tells him:

"We see, like those who have imperfect sight,
The things," he said, "that distant are from us." (Inf. X

We can safely infer, I think, that Dante has in mind the
dition of "old sight" or presbyopia.

Roger Bacon (1214-1292 (1298)) knew lenses and
they were useful for near vision in the old. For optical
poses they appear to have been ground first about 1285
certain Salvino degli Armati, said to have died in 1317
monk of Pisa, Alexander della Spina, who died in 1313,
has been accredited with the invention of spectacles and
the promotion of their use. So we see that lenses for op
purposes really came generally into use after Dante's
and that presbyopia the cause of the "imperfect sight."
sees only, "the things that distant are from us" then went
corrected.

In the Inferno we find the largest number of references
a purely anatomical nature. These are for the most par
fact almost entirely, very general. The spirits in the Infer
suffering the tortures of the condemned, having their
vivisected, torn and mutilated, their every parts exposed.
meeting our poet thus, would naturally call upon the anato
cal knowledge of Dante to give an adequate account of
he saw. This is done free from all descriptive exactness
an aim to present the tortures of Hell in the most awful

the form descriptive
itomy takes in the poem. In the ninth gulf of Hell, Dante
ets with Mahomet who is,

ent from the chin to where one breaketh wind.
etween his legs were hanging down his entrails;
is heart was visible, and the dismal sack
hat maketh excrement of what is eaten. (Inf. XXVIII, 24.)

other shade speaks these words:

arted do I now bear my brain, alas!
rom its beginning, which is in this trunk.[1] (Inf. XXVIII, 140.)

sees a demon clutch a sinner by

* * the sinews of the feet.[2] (Inf. XXI, 36.)

e unfortunate is transfixed by a serpent

here where the neck is knotted to the shoulders.[3]
(Inf. XXIV, 98.)

ll another is pierced through

* * in that part[4] * * * whereat is first received
ur aliment * * * * * (Inf. XXV, 85.)

y translates this passage, "In that part whence our life is
rished first—" (*Donde prima é preso nostro alimento*). It
generally held down to Dante's time that the human fœtus
ithed and was nourished through the umbilicus and by
ing upon the cotyledons. This opinion is probably based
n the study of the placentæ in the higher mammals, especi-
the pig, which were used almost exclusively for anatomical
lies in the Middle Ages, and the results obtained were as-
ed to apply also to man. We can readily understand the
in the mentioned belief if we recall that in the non-
duate placentæ (the forms most commonly met with in the
nals thus employed) the chorionic villi are concentrated
definite patches or cotyledons, which at birth separate
the uterine mucous membrane, without tearing the
r away. The spirit of Guido Count of Montefeltro tells
te that the deeds he did were given him by his mother

ile I was still the form of bone and pulp. (Inf. XXVII, 73.)

passage conforms with the belief current during the
ter part of the Middle Ages, that from the semen are first
ed the membranes—"pulp"—a portion of these are then
formed into cartilage and bone, another into blood vessels,
, nerves and so on. In another passage Dante refers to
osition standing next to Virgil as being

n that side where people have their hearts. (Purg. X, 48.)

nnection with this line one should recall that Galen, bas-
is opinion upon the finding in animals, assigned also to
uman heart, a position in the center of the thoracic cavity.
mained so until Vesalius (1513-1564) gave it its true
ion.

rhaps of greatest interest among the medical references

to inform himself on the natural process involved in the birth and development of the human body, begs Virgil to enlighten him. Virgil prays Statius that he give to our poet the enlightment sought. Statius then turns to Dante with

* * * * * "Son, if these words of mine
Thy mind doth contemplate and doth receive,
They'll be thy light unto the How thou sayest.
The perfect blood, which never is drunk up
Into the thirsty veins, and which remaineth
Like food that from the table thou removest,
Takes in the heart for all the human members
Virtue informative, as being that
Which to be changed to them goes through the veins.
Again digest, descends it where 't is better
Silent to be than say; and then drops thence,
Upon another's blood in natural vase.
There one together with the other mingles,
One to be passive meant, the other active
By reason of the perfect place it springs from;
And being conjoined, begins to operate,
Coagulating first, then vivifying
What for its matter it had made consistent.
The active virtue, being made a soul
As of a plant (in so far different,
This on the way is, that arrived already)
Then works so much, that now it moves and feels
Like a sea-fungus, and then undertakes
To organize the powers whose seed it is.
Now, Son, dilates and now distends itself
The virtue from the generator's heart,
Where nature is intent, on all the members.
But how from animal it man becomes
Thou dost not see as yet; this is a point
Which made a wiser man than thou once err
So far, that in his doctrine separate
He made the soul from possible intellect,
For he no organ saw by this assumed.
Open thy breast unto the truth that's coming,
And know that, just as soon as in the fœtus
The articulation of the brain is perfect,
The primal Motor turns to it well pleased
At so great art of nature, and inspires
A spirit new with virtue all replete,
Which what it finds there active doth attract
Into its substance, and becomes one soul,
Which lives, and feels, and on itself revolves.
And that thou less may wonder at my word,
Behold the sun's heat, which becometh wine,
Joined to the juice that from the vine distils.
Whenever Lachesis hath no more thread,
It separates from the flesh, and virtually
Bears with itself the human and divine;
The other faculties are voiceless all;
The memory, the intelligence, and the will
In action far more vigorous than before.
Without a pause it falleth of itself
In marvellous way on one shore or the other;
There of its roads it first is cognizant.
Soon as the place there circumscribeth it,
The virtue informative rays round about,
As, and as much as, in the living members.
And even as the air, when full of rain,
By alien rays that are therein reflected,
With divers colors shows itself adorned,
So there the neighboring air doth shape itself

---

inal cord.
ndon of Achilles.
venth cervical vertebra.
e navel.

Into that form which doth impress upon it
Virtually the soul that has stood still.
And then in manner of the little flame,
Which followeth the fire where'er it shifts,
After the spirit followeth its new form.
Since afterwards it takes from this its semblance,
It is called shade; and thence it organizes
Thereafter every sense, even to the sight.
Thence is it that we speak, and thence we laugh;
Thence is it that we form the tears and sighs,

* * * * * * * *

According as impress us, our desires
And other affections, so the shade is shaped,
And this is cause of what thou wonderest at." (Purg. XXV, 33.)

I have given this discourse of Statius thus complete, both for its medical interest and for its exemplifying, perhaps better than any other one passage in the Divine Comedy, the wonderful power of Dante in blending into poetry his science, philosophy and theology. Comments upon this passage are not wanting. Averroës, Thomas Aquinas, Galen, Aristotle and Hippocrates are mentioned as co-contributors. Quotations from the lengthy dissertations of these authors bearing on this interesting subject cannot be given here, but a few brief notes may serve to add interest to it. The *perfect blood* which is not taken up by the veins, is the arterial, the abode of the vital spirits, the venous blood serving merely in nutrition. In the heart the blood is perfected; this appears purely an adoption from Galen. Dante's view relative to the "mingling" of the sexual elements to which he refers as blood, is expressed figuratively. The male element, the semen, was believed even in very ancient times to contribute directly as such in the formation of the fœtus, for Hippocrates and Aristotle taught that it came from all parts of the body, and Galen from the blood in the testicle. The female element was generally also regarded as semen; this Galen leads from the ovary downward through the excretory ducts (the Fallopian tubes) and during and after coition, believes it to be uniformly mixed with the male element. Hippocrates and Aristotle held the female semen to be a vaginal secretion which during coition was increased in quantity. Aristotle states that the female projects her semen into the os uteri, where also that from the male is received; these mingling are from thence drawn into the uterus by inhalation, in the manner we inhale through mouth or nostril. Dioscorides, whom Dante mentions by name, and Athenæus, were of the opinion that in the female the menstrual blood serves as the material mass and that the male semen gives form to the new life. The conception that one of the elements is passive and the other active is probably also borrowed from Galen, who taught that the semen of the male was hotter and of denser consistency than that of the female, which latter in accordance with the greater "coldness of women," was colder and very fluid and acted merely as an excipient and nutritive material, giving rise to the fœtal membranes only, while the male semen was concerned in the making of the brain, the seat of the rational soul. The comparison Dante draws between the vegetative soul of man and that of the plant is this, that in man it must be developed, whereas in plants it is from the first complete. In man the vegetative soul in its development verted into the sensitive soul. The "man" referred to ius as wiser than Dante is generally accepted to be He who taught that the minds of all men were one and the same universal intellect. It may be added science and philosophy were confirmed in the opinion soul of the new life was breathed into it by God.

The purely medical references, *i. e.*, to internal leave no doubt that Dante was in possession of more lay knowledge of this branch of medical science. markedly apparent that, as compared to the purely references, these are characterized by a much greater scriptive exactness, denoting a keener study and insight is this to be wondered at if we stop to recall the state which anatomy had lapsed during the thirteenth and fourteenth centuries. Medicine, through the impulse by the Arabs and by the freer dissemination of Greek cine, continued more active and certainly, though in measure, progressive, while anatomy on the contrary where Galen had left it.

Leprosy, so prevalent during the thirteenth century, quently referred to by Dante. He tells of two spirits flicted:

I saw two sitting leaned against each other,
As leans in heating platter against platter,
From head to foot bespotted o'er with scabs;
And never saw I plied a currycomb
By stable-boy for whom his master waits,
Or him who keeps awake unwillingly,
As every one was plying fast the bite
Of nails upon himself, for the great rage
Of itching which no other succor had.
And the nails downward with them dragged the scab,
In fashion as a knife the scales of bream,
Or any other fish that has them largest. (Inf. XXIX, 73.)

Evidently Dante seeks to picture what we today would nodular or tubercular leprosy, in the advanced stage of there is frequently associated pain, irritation and tion, which latter when excessive gives rise to an not unlike that of ichthyosis, whereupon rests the poet's ence to the scales of fish. The ultimate loss of the nails disease finds expression in these words, addressed by to a leper who plies himself with scratching:

"* * * so may thy nails suffice thee
To all eternity unto this work." (Inf. XXIX, 89.)

Dante meeting his friend Forese among the spirits in gatory, recognizes him only by hearing his voice, and pealed to with

"Ah, do not look at this dry leprosy,"
Entreated he, "which doth my skin discolor,
Nor at default of flesh that I may have." (Purg. XXIII,

The nodular form of leprosy, attacking frequently first face and ears, often enlarging these and giving rise to a ing of nodules on the brow, with a consequent deepening natural furrows, especially at the root of the nose, a peculiar lion-like aspect, to which the ancients gave the

Dante should have failed to recognize him.

he crusaders were largely instrumental in disseminating sy in Europe. It had reached its height at about the that Dante lived, abating gradually until in the latter part ie sixteenth century it disappeared practically from the f endemic diseases in middle Europe. The belief in its gious nature, established in ancient times, led to the isola- of those suffering with it. In Europe and especially in were special institutions (*lazzeretti*) erected for lepers, ly in secluded places or beyond the city gates. The in- s of these were under general surveillance, and were given iany places special clothing, marked to indicate their tion, or had to carry a wooden rattle to make known their oach or a cane with which to point out or touch what they ed. Means of support other than begging was denied , and they were generally shunned or treated as outcasts. is expressed in an address of Dante to two spirits—

> **not your foul and loathsome punishment**
> **e you afraid to show yourselves to me."** (Inf. XXIX, 107.)

further great scourge, widespread over most of Italy and iern Europe, was malaria. A short excerpt taken from ay's Handbook of Central Italy, depicting the devastation alaria in Italy, is not without interest in this connection. ading of the Lake of Bolsena, in the vicinity of Rome, re informed that, "The treacherous beauty of the lake als malaria in its most fatal forms; and its shores, al- gh there are no traces of a marsh, are deserted, excepting a few sickly hamlets are scattered on their western s. The ground is cultivated in many places down to the 's edge, but the laborers dare not sleep for a single night, ig the summer or autumn, on the plains where they work y; and a large tract of beautiful and productive country luced to a perfect solitude by this invisible calamity. ing can be more striking than the appearance of the lake, ut a single sail upon its waters, and with scarcely a n habitation within sight of Bolsena; and nothing per- can give the traveler who visits Italy for the first time re impressive idea of the effects of malaria." In the gulf of Hell the spirits' suffering is intense, such that writes of it,

> **t pain would be if from the hospitals**
> **aldichiana, 'twixt July and September,**
> **of Maremma and Sardinia**
> **he diseases in one moat were gathered,**
> **was it here, and such stench came from it**
> **rom putrescent limbs is wont to issue.** (Inf. XXIX, 46.)

's mention of the time "'twixt July and September" in- s that period of the year in which malaria was at its

The marshy regions of Italy, the Maremma, along the f the Tyrrhenian sea, stretching from the mouth of the Magra to that of the river Volturno, were up to within ratively recent times uninhabitable because of the d prevalence of malaria. Systems of drainage and fill- have now made this region habitable and converted it rich and fertile area. In Dante's time these marshes about the Lake of Bolsena. What stench must have been created in the hospital wards, such as they were, where coction or suppuration was above all things promoted in the treatment of wounds and other surgical lesions! Of interest is the following reference. Dante, who is to mount upon the back of Geryon, becomes unnerved,

> **Such as he is who has so near the ague**
> **Of quartan that his nails are blue already,**
> **And trembles all, but looking at the shade.** (Inf. XVII, 85.)

Very probably the chills and rigors characteristic of the cold stage in malaria are here thought of. However the term, *quartan,* most usually applied to one form of malaria in the present day, had in Dante's age a more general and wider application. The classification of fevers in vogue then being into semitertians, tertians, quartans, quintans, septans and nonans. The prognosis depended much upon whether these were intermittent or protracted, whether diurnal or nocturnal. The quartan fever was considered as not only free from evil consequences but even favorably, in that it was thought to often carry off other diseases with which the patient suffered.

The following lines intimate Dante's keen powers of observation and are of interest in their medical allusion. He sees a spirit stung by a serpent; the spirit looked at his aggressor,

> *** * * but said naught;**
> **Nay, rather with feet motionless he yawned,**
> **Just as if sleep or fever had assailed him.** (Inf. XXV, 88.)

Dante probably gleaned this from observing the lassitude and desire to yawn and stretch which is so commonly felt at the onset of intermittent fevers and particularly so in the first stage of malarial paroxysms.

In the tenth gulf of Hell, Dante is held fascinated by a dispute and wrangle between two sinners, Adam of Brescia, a counterfitter, and Sinon, the Greek, who persuaded the Trojans to accept the wooden horse. Of the former we are given this description:

> **I saw one made in fashion of a lute,**
> **If he had only had the groin cut off**
> **Just at the point at which a man is forked.**
> **The heavy dropsy, that so disproportions**
> **The limbs with humors, which it ill concocts,**
> **That the face corresponds not to the belly,**
> **Compelled him so to hold his lips apart**
> **As does the hectic, who because of thirst**
> **One tow'rds the chin, the other upward turns.** (Inf. XXX, 49.)

Adam confides to Dante his craving for a drop of water and tells him that his memory of verdant streams dries him up more

> **Than the disease which strips my face of flesh.**
> (Inf. XXX, 70.)

So heavy is he with his dropsy that in a hundred years he can not move an inch. Upon request of Dante, Adam gives information of his neighbor, Sinon of Troy, who is smoking as "a wet hand does in winter," and who reeks with acute fever. Sinon becomes angered at Adam for the account given Dante of him, and to avenge this strikes Adam

*** * * with the fist upon his hardened paunch**
It gave a sound as if it were a drum. (Inf. XXX, 102.)

Adam retaliates by striking Sinon in the face "that did not seem less hard," than Adam's paunch. An altercation between these two then follows, in which Sinon addresses Adam with

"And rueful be it to thee the whole world knows it."
"Rueful to thee the thirst be where with cracks
Thy tongue," the Greek said, "and the putrid water
That hedges so thy paunch before thine eyes." (Inf. XXX, 119.)

To which the false coiner makes reply,

*** * * * * "So is gaping wide**
Thy mouth for speaking evil, as 't is wont;
Because if I have thirst and humor[5] stuff me,
Thou hast the burning and the head that aches,
And to lick up the mirror of Narcissus
Thou wouldst not want words many to invite thee."
(Inf. XXX, 125.)

To diagnose the disease with which Dante would have us know Adam is afflicted may appear to be of idle purpose; but granting permission to speculate, the heavy dropsy, the wasted features may be assumed to conform to the ascites and facies met with in hepatic cirrhosis. And the hectic, with cracked tongue longing for water, with a paunch that when struck sounds like a drum, and again the facial expression (Hippocratic facies), brings to mind general peritonitis, for it is common to see these both in one, and the patient down with hepatic cirrhosis dies of secondary peritonitis. Dante's remark, applied to Sinon, whom he saw "smoking like unto a wet hand in winter," is probably learned from Hippocrates. Francis Adams' translation of Hippocrates' treatise on Airs contains the following remarks: "A common fever (epidemic) therefore is such because all draw in the same breath (pneuma)." Hippocrates afterwards attempts an explanation of the phenomena of rigors, which, however is not very intelligible, and then of the febrile heat and *sweats* which succeed them. The latter he compares to the "condensed steam of boiling water." The views concerning dropsy current in Dante's day were largely those of Hippocrates and Galen, their opinions being the code taught. Hippocrates held that there were "two kinds of dropsy, the one anasarca, which when formed is incurable, the other is accompanied with emphysema (tympanites?) and requires much good fortune to enable one to triumph over it." Galen's commentary on this informs us that in place of two dropsies there are three at least, meaning by these, anasarca, ascites and tympanites. A like opinion is given by Paulus Ægineta.

The following reference seems in its medical affirmation almost as if spoken by a physician. Dante meets with the spirits punished for soothsaying. They, because they sought to see before them and foretell things, are made to look and move backwards. Dante sees some who

Wondrously * * * seemed * * * distorted,
From chin to the beginning of the chest;
For tow'rds the reins the countenance was turned,
And backward it behooved them to advance,
As to look forward had been taken from them.
Perchance indeed by violence of palsy
Some one has been thus wholly turned awry;
But I ne'er saw it, nor beieve it can be. (Inf. XIX,

The physicians worthy of mention in the Divine
we can dismiss with a few remarks, for in
nature of the poem they are given no
their art. For the same reason also we meet with a
sence of any reference to therapeutics. The
most part are but mentioned by name and grouped
spirits in interesting assemblages and, like all of
characters, are presented merely as representative
entering the first circle of the Inferno, the Limbo,
those virtuous but unbaptised, finds among the

Galen, Hippocrates and Avicenna,
Averroes who the great Comment made. (Inf. IV, 143.)

In their circle also,

Of qualities I saw the good collector,
Hight Dioscorides. * * * * (Inf. IV, 140.)

Associated with these are the philosophers and
spirits, the master of this throng,

All gaze upon him and all do him honor. (Inf. IV, 133.)

is Aristotle. Of these Hippocrates, Averroes and
receive further mention in the Comedy. In an
Dante makes to the pursuit of worldly things
vine, he mentions Taddeo, as type representative of
lowing the former. A like allusion is found in the

One after laws and one to aphorisms. (Par. XI, 4.)

Here undoubtedly Dante refers to the well-known
of Hippocrates.

Whether or not Dante knew these masters by
need not concern us, though it is fair to assume
at least in part and his many commentators
this, especially on the ground that to join the guild
cians and apothecaries some knowledge of medicine
been his as a prerequisite.

To the medical student these names are familiar.
Hippocrates and Galen are too well known to require
ment, excepting perhaps that Aristotle came in
medicine really only through his physiology and his
in the field of comparative anatomy.

Avicenna (980-1037), surnamed by the Arabs,
of Physicians, enjoyed, next to Galen, the
in the medical world of the Middle Ages. The
hundred and five known writings, his *Canon*
system of medicine in five books, was the text and
medical art and in its Latin translation served
as late as the seventeenth century. His reputation
by the nullity of his time, was gained more
nical abilities and high cast positions than by his
accomplishments. His works were largely mere

---

[5] ure.

studied throughout the Middle Age as the main
book on this subject. He is said to have recognized some
hundred plants. From among his medicines some are
place in the pharmacopeias of today, among others, cas-
il, cinnamon, fern and aloes.

erroës (1126-1148), like Aristotle, philosopher rather
physician, translated the writings of the latter into Arabic
which tongue they were rendered into Latin, first, it is
, in 1472. His writings are of interest to the physician
at they have supplied numerous commentaries to those
ristotle, treating on medical subjects, and in opposing
of Galen's views. The writings of the authors mentioned
those most extensively employed as texts in medicine in
ime of Dante; from them the professors in medicine read
eir classes, explaining, translating and making com-
iums from and comments to them.

addaeus, of Florence (1215-1295 (1303)) was a contem-
y of Dante. He held a professorship in medicine in Bol-
Through his efforts the practical introduction of Arabic
ces into the medical schools of Italy was largely due. He
o generally accredited as being the first known medieval
r who assayed in good faith and with excellent judgment,
ite the philosophy of the age with rational medicine.
his professional career resulted the translation of Aris-
commended by Dante in the *Convito,* and his com-
on the Aphorisms and Prognostications of Hippocrates
Galen. He is mentioned by the early commentators of
e as having been the most skilled physician of his
nd in originality equal to Hippocrates. Dante's choice of
s a representative of those engaged in pursuit of worldly
s may rest upon the quoted fact that Thaddaeus was
ius for his exorbitant fees and his covetousness. We are
hat in 1285 he asked three thousand Bolognese lires and
cort to and from the place for his services in attending
alian nobleman.

might add to this list of physicians the names of some
while not referred to by Dante as such, yet deserve recog-
from the medical student. From among the ancients to
Dante gives a place in the Divine Comedy we may select,
s of Miletus, Anaxagoras, Empedocles (to whom we owe
rms amnion and chorion), Heraclitus, Democritus, Epi-
and Zeno. These philosophers were metaphysicians and
ists (natural philosophers) as well, and in those capa-
xercised a very essential influence upon Greek medicine.
hilosophers of the Middle Ages, who busied themselves
ntally with medicine, that being a branch of medieval
ophy, are represented by Albertus Magnus, Thomas
as, Hugo de St. Victaire and Peter of Spain. The
ns of Albertus Magnus and Thomas Aquinas exercised
profound influence upon the medicine and the natural
s generally during the entire Middle Ages following the
in which they lived.

sidered by themselves, the medical references in the
Comedy give no reliable index from which to form an
a of Dante's medical knowledge. True some few give without doubt he gleaned also from observation, yet we can ill afford to claim these as the product of a mind especially trained in medicine. For the most part the references are popular and general and at best tend to give but a partial reflection of the medicine current in Dante's time. As we read it in the Divine Comedy it is the medicine of Hippocrates and Galen, with a touch of the Arabic, and interwoven with theology and mysticism. Whether what it expresses was Dante's belief we can not decide. Dante may have believed with some of the ablest minds of his day in the virtue of gems and amulets, in magic and in the healing powers of the saints and the evil workings of the devil, or he may have shared these beliefs as little as we do today. His age professed such beliefs and he may have availed himself of its creed in medicine, as in other things, the better to induce appreciation of his poem, for he intended it to be read by all men and therefore wrote it in the " vulgar " tongue. The medicine in Homer, Shakespeare or Goethe has not proved these authors to have been physicians, neither can that of the Divine Comedy or for that matter, that in any of Dante's writings make out Dante a physician. The truth is, that it was only as a poet that Dante was great and original, and whether physician or not, he did not intend to convey his knowledge of medicine to us, but drew upon it merely as he did upon all those branches of science and art with which his genius and wide range of learning had acquainted him to contribute their share in the making of the pillars of that enduring superstructure the Divine Comedy, the ineffaceable mirror of the Dantean Age.

REFERENCES.

It would require a very large volume to contain nothing more than the names of almost innumerable particular and special students of and treatises that have been published on the Divine Comedy. I doubt not that more than one dissertation on the medicine in the Divine Comedy may be found amongst the literature of different nations, if it were sought for amongst the hundreds of books and thousands of pamphlets. I have made no effort to find one. I have availed myself of and borrowed freely from many books, deemed reliable sources treating on the life of Dante, on the history of medicine and the history of that age. A few of those I have found most helpful are here added.

I. BIOGRAPHY.

Kraus, Franz Xaver: Dante, Sein Leben und sein Werk, sein Verhältniss zur Kunst und Politik. Berlin, 1897.

Scartazzini, G. A.: Dantehandbuch. Leipzig, 1892.

———. Dante Alighieri, Zeit, Leben und Werke: Leipzig, 1869.

Witte, Carl: Danteforschungen. Bd. I, Halle, 1869; Bd. II, Heilbronn, 1879.

Lowell, James Russell: Dante: cf. Among my Books, Second Series, 1876.*

* To all American readers, who would seek a more intimate acquaintance with Dante, I recommend Lowell's exhaustive essay.

II. HISTORIES OF MEDICINE.

Häser, H.: Lehrbuch der Geschichte der Medizin. 1875-1882.

Wernich und Puschmann: Biographisches Lexikon der hervorragenden Aerzte aller Zeiten und Völker. 1884-1888.

Kotelmann, L.: Gesundheitspflege im Mittelalter. 1890.
Handerson, H. E.: The School of Salernum. 1883.
Hecker, J. Fr. K.: Geschichte der Heilkunde. 1822-1829.
———. Die Tanzwuth, eine Volkskrankheit im Mittelalter. 1832.
Baas and Handerson (Trans.): Outlines of the History of Medicine and the Medical Profession. 1889.
Magnus, H., and Salinger (Trans.): Superstition in Medicine. 1908.

III. GENERAL.

Staley, E.: The Guilds of Florence. 1906.
Hallam, H.: State of Europe during the Middle Ages.
Lees, B. A.: Central Period of the Middle Ages. 19
Lodge, R.: The Close of the Middle Ages, 1909.
Emerton, E.: Mediaeval Europe. 1894.
Taylor, H. O.: Classical Heritage of the Middle Ages
Allbutt, T. C.: Science and Mediaeval Thought. 1900.

MOLIÈRE AND THE PHYSICIAN.

By Max Kahn, M. A., M. D., New York.

Boileau, the brilliant and outspoken critic of the French Elizabethan Era, in a conversation with Louis XIV, informed the *Grand Monarque* that he considered Molière the greatest of French writers, whereat Louis the Great sneered. It was this same critic, who, on being asked his opinion of some stanzas written by the King, cleverly replied: "Sire, in all things are you successful. You had desired to write the worst poem in the world, and you have admirably fulfilled your wish." We know not what the scion of the Bourbons retorted, nor how he felt. That he took it coolly is really praiseworthy. It is no wonder that the French king, although he always felt a kindness for the great humorist, disagreed with Boileau. The son of an upholsterer, the man who so inimitably strutted on the stage personifying ludicrous personages, could not, in the opinion of Louis XIV, be the greatest *littérateur* in France.

Not only this monarch, but many wise men in later times, took issue with Boileau. Corneille, Racine, La Fontaine, La Rochefoucauld have all been given precedence over the man who has made the whole world laugh for several centuries. During life Molière suffered intensely from lack of appreciation by the populace and the nobility. Every courtier behaved superciliously toward the cleverest man in the court. He was very poor. Twice he was imprisoned because of lack of funds for the payment of certain debts that were incurred in his attempts to organize a theatre. The clergy were openly against him. The faculty of medicine was silent, because of impotency. At death he was refused consecrated burial, and only a mandate from Louis XIV secured for him religious rites at his funeral. He was interred on a rainy day. The beadle or sexton forgot to mark the grave wherein Molière was laid, so that even the last resting place of the greatest of French dramatists is not known.

All the sciences were at first feared and opposed. So was medicine. What we do not understand, we fear or ridicule. The physician as the expounder of the mysterious science of medicine has, in all ages, caused fear in the timid and has been the butt of criticism from the skeptics. Only a few who have understood have given the physician and his art their just honor and respect.

Molière was not of these. He understood, I firmly believe, the true value of medicine, but he was disgusted with the practice of it in the seventeenth century. When science is degraded to quackery, and when the physician pursues the methods of the charlatan, there is certain to arise a opposition to such flagrant ignorance and dishonesty. dramas "Monsieur de Pourceaugnac," "The Flying cian," "The Doctor in Spite of Himself," and "The Do Love" were the direct outcome of a healthy dissatis with a profession whose only claim to efficacy was that not changed since the days of Hippocrates and Gale which took more pride in black gowns and Latin gi than in diagnosis and prognosis. When it is said that M was feared by churchmen and physicians one has said against the reputation of the physicians of those days. who was so logical as to be against the clergy of the s teenth century must have had enough cause for oppos medical faculty of the time.

Jean Baptiste Poquelin was born in Paris in the mo January, 1622, six years after the death of the world's est dramatist in Stratford-upon-Avon. His father wa industrious and thrifty upholsterer. That the Poquelin ily was well-to-do is to be seen from the inventory give the will of Jean Baptiste's mother. She bequeathed ware and goldware and certain diamonds to the mem her family, and left each of her children an inheritan five thousand livres. The story extant that the future atist suffered from the tight-fistedness of his father is imp ble. Doubtless his father with the usual bourgeois resp gold, was dissatisfied with the tastes of his son. Neverth he paid his son's debts and saw to it that the boy re an education above that of the average lad of the period

When yet a boy, Jean Baptiste found his father's distasteful. The attraction of the streets, where gay were to be seen, was more to him than the disgusting mon of the upholsterer's shop, where success depended upon liness, punctuality and lacquey-like fawning upon nobl tomers. Molière was never punctual nor strictly orderly certainly he never could toady, and lacking these qua there was naught in his ancestor's business to please him. smell of glue in his father's shop could not satisfy the who loved the odors of sweet smelling flowers and the of the fields and the sunshine and the forests.

The streets of Paris, though very narrow and very in those days, were quite gay. Swashbuckling mus haughtily strutted about and were very happy in pro duels. They fought for insults to the king or their reg or to prove the superiority of certain sweethearts, or fo

Rostand has made the hero of his
drama, fought a dozen times and killed ten adversaries
ler to defend the honor of his own elephantine proboscis.
ttes, wenches and quacks traversed all the thoroughfares,
accosted all passers-by who seemed capable of spending
sous. In certain main streets, it was especially inter-
g. In the rue de Pont Neuf, the comedians of the day
to perform for the benefit of the public. Here young Jean
iste was Bellerose and Mondory and Gros Guillaume,
amous artists of that time, who set the audiences roaring
ieir coarse jests and phantastic contortions. Here, also,
aw Guillot Gorju, the actor quack, who ridiculed *les
ecins,* and whose sharp witticisms Molière incorporated
into his dramas.

t the age of fourteen Molière was sent to the Jesuit College
lermont near Paris, where he associated with sons of the
lity. Here he undoubtedly saw Prince Armand de Conti
later became his patron. There is no evidence, however,
this prince ever so much as talked to the low born Poquelin.
e else is known of Molière's student life. He studied for
time under Gassendi. He especially admired Lucretius
Terence among the ancients and Rabelais among the
rns. He left the above named institution, after a course
tudy of several years, for the law school at Orleans,
ere," as his enemy Le Boulanger de Chalussay has it,
donkey could buy a diploma." However, he went to
aw courts only once.

tradition would have it that Molière studied for the
thood, but this is wholly a fable, for the bright-witted,
willed Molière could never brook a monkish life with its
ctions and monotony. Still, if he ever did intend to
ice law or study theology, the purpose must have been
desultory than serious, for we find him in the month
nuary, 1643, fully embarked on the venturesome career
median and stage manager. (Chatfield-Taylor: Life
olière.)

avelling, actor-like, he fell in with the Béjart family, a
ing band of performers, and soon ingratiated himself
vor of Madeline Béjart whom he married. Aided by
weetheart and the whole company, he opened "The
rious Theatre." This venture was a failure, and after
imprisoned twice for debt, Molière had to flee Paris to
another incarceration in the debtor's jail. Together
his company he strolled over France and appeared in
aux, Toulouse, Lyons, Orleans, Limoges, Narbonne and
as at different periods, everywhere receiving permis-
o erect a stage to perform comedies.

ccessively under the patronage of Duke D'Epernon and
e de Conti, the fortunes of the poet began to flourish.
e provinces and in the capitol, Molière kept his eyes
and he himself began to ridicule the foibles and vanities
average Parisian bourgeois. Soon dramatic works fol-
one another, and his fame reached the ears of the king,
rom this time forward was quite a generous patron.
g this period he wrote his greatest dramas, and, receiv-
otection from the king, he attacked the medical profes-

he had anticipated, the doctors refused to attend him in his last illness. He died on the seventeenth of February, 1673. "This same day, about ten o'clock at night, after the comedy, Monsieur de Molière died in his house, rue de Richelieu. He had played the part of the said *malade* (*Le Malade Imaginaire*) suffering from cold and inflammation which caused a violent cough. In the violence of the cough he burst a vessel in his body, and did not live more than half an hour or three-quarters after the bursting of the vessel." (La Grange: Register.)

To fully comprehend the causes that led Molière to wage a bitter warfare against medicine and the doctors, we must briefly review the medical history of the seventeenth century. Periods in which transpire changes from the accepted state of events and things are ever characterized by violence, satire and much bitterness. The seventeenth century is the transition era from mediæval irrationality and empiricism in medicine to modern scientific experimentation and rationality. In times of revolution, there are ultra-conservatives and ultra-radicals. The medical iconoclasts of the reign of Louis XIV were opposed by the unreasoning obstinacy of the Parisian medical faculty, who thought it a crime to venture out of the rut of prescribed practice. "Who shall judge when doctors disagree," is an old apothegm. The layman becomes puzzled and consults the quack, and the more strife and contention there is between the various schools of medicine, the more will quackery and dishonesty thrive. Between the violent radical and the obdurate conservative, the enlightened cool headed physician is lost sight of.

The practice of medicine in the seventeenth century was mere empiricism. The faculty was inculcated with the dignity of its profession, and laid much stress on the ceremonials of practice. The oath that a professor of medicine took when nominated is quite characteristic: "I here pronounce faithfully to teach in a long gown with wide sleeves, a doctoral cap on my head, a knot of scarlet ribbon on my shoulder." Nevertheless an epoch which could produce such men as Harvey, Sydenham, Malpighi, Willis and many other famous doctors whose names are almost household words, cannot be looked upon as a period of grotesque hypocrisy and profound ignorance. There must be another side to the matter, and the legend of the satirist must not be wholly taken for granted:

Longue peruque, habit grotesque,
Affecter un air pédantesque,
Cracher du grec et du latin,
Tout cela réuni fait presque,
Ce qu'on appelle un médecin.

Molière has tremendously exaggerated in the humorous episodes and the comic situations the true condition of his time. Disgusted as he was with science that was unable to cure his disease, (because no science could cure it), he sought aid amongst the quacks of the Pont Neuf; he consulted the town criers and the wandering mountebanks. If we examine the lives and works of leading physicians of Paris of the seventeenth century, we must inevitably come to the conclusion that

Molière's doctors, the Tomès, Desfonandrès, Macrotons, Bahis are mere burlesques. That they have survived such a long period is due to the fact that they are comical even if not true, and that in their conversation and behavior grains of realism may be discovered.

Molière was very well acquainted with the physicians of the court. Fagon was at that time the chief physician in attendance on the king, a position of great dignity and importance. Fagon occupied the chair of Botany in the *Jardin Royal,* and it was his endeavors and studies that added importance to the science of botany. He corresponded with the learned men of the whole world, and received from them rare botanical specimens which he stored in the *Jardin Royal,* making that institution the most famous museum in Europe. In the year 1665 he made the first catalog of this collection under the title of *Hortus Regius*. He was a most honest man. "His disinterestedness," says M. Fauvelle, "was as wonderful as his learning. He abolished the buying of offices in the learned colleges, and refused large sums of money that were offered him. His modesty was very great, and he always sought to avoid the honors that the faculty desired to confer on him. Compulsion was exerted to persuade him to accept his nomination to the *Academie des Sciences.*"

Dr. Fagon's co-worker was Armand de Mauvillain, the friend of Molière. de Mauvillain was a physician of the Montpellier school, and, therefore, an enemy of the Parisian faculty. It has been surmised that this doctor gave a helping hand to Molière in writing the satires on Medicine. Receiving the degree in medicine from the University of Paris in 1648, he settled in the capital and had quite a lucrative practice. With the advance of the teachings of Harvey and Malpighi, he became an adherent of the theory of the circulation of the blood. de Mauvillain was very learned and very liberal, and the conservatives considered him the anti-Christ of medicine. "If he did not resemble the physicians in Molière's dramas," says Professor Funck-Brentano, "it was because he was Molière's physician himself; and this is enough ground for believing that de Mauvillian, powdered and perfumed as he was, served and abetted his poet friend in order to ridicule his beloved colleagues of the faculty." (Funck-Brentano: Die Ærzte Molières.)

The Parisian college was against all modernism. Like the Chinese, the doctors had built a wall of stone and adamant against the ingress of advanced thought. As Dr. M. J. Conklin remarks, the spirit of the times is happily shown in the following extract from the statutes of the Academy at Helmstadt:

> We desire the medical art, even as it was rightly and wholly fixed and handed down, under the guidance of God, by the artists Hippocrates, Galen and Avicenna, to be preserved and diffused by teaching. We recommend that all Empirics and the 'Tetralogies' of Paracelsus, with other corruptions of medicine not agreeable to the doctrines of Galen and Avicenne, be banished entirely from the academy.

This doctrine was a stumbling block to the progress of all science.

In the reigns of Francis II, Charles IX, Henry III, and H IV, the faculty was bitterly embroiled with Ambroise Paré. As Mr. Stephen Paget says "it was a sort of War for the deliverance of surgery from the bondag medicine."

In the year 1575 (April 22), Paré published his bo folio of 945 pages, on surgery. It was written in Fren that even a plain mortal (one not begowned or bear- could understand every word of it. The Faculty be alarmed. On July 9 of the same year, they met and observing that Paré was only a barber surgeon, thrust a them by the king, ignorant of Latin and Greek, they ch him with gross indecency and immorality. Five days Parliament called the case for hearing, and carrying the to the end, decided that Paré had no legal right to publi work on medicine without first receiving permission fro faculty. The defence of the eminent surgeon was shaft of sarcasm against ignorant intolerance:

> For more than thirty years I have been printing my trea on surgery . . . . which made me think, if I gathered them gether, I should be doing a thing very agreeable to the pu Having accomplished it, and that at an expense past think lo and behold—the physicians and the surgeons have set the selves to obscure and suppress them, for this sole reason wrote in our mother tongue, in phrases quite easy to be un stood. The physicians feared lest all who should get the into their hands would be advised how to take care of themse in time of sickness, and would not be at the pains to call the The surgeons were afraid lest the barbers, reading these works, would receive full instruction in all the operatio surgery, and would come to be as good as themselves and trespass on their domains.

When Paré planned to publish his *second* edition, he sulted the faculty, and in order to please them, he re his obnoxious articles on fevers (which only physicians write about) and included his observations on that su in his discussion of tumors. This modesty and mee pleased the "congregated college," and they did not op the publication of this work. (S. Paget: Ambroise Paré His Times.)

The faculty in the time of Louis XIV was the same aspirations and ideas as the faculty in the times of the Valois. Surgery was opposed because no dignified phys would hold a knife in his hand, and to elevate the barbe the dignity of a doctor was not to be thought of. Circula of the blood was proscribed because it was English. If blood did circulate it was against the laws of the faculty had no business to flow contrary to the beliefs of Hippo and Galen. "Besides," said they, "if the blood circulates is useless to bleed, because the loss sustained by an organ be immediately repaired, hence bleeding is useless, the the blood does not circulate."

The prescribing of antimony was prohibited by the fa at Paris, for the simple reason that the faculty of Mo lier highly recommended it. de Mauvillain espoused the of antimony and circulation of the blood and was, ther ostracized from the association of physicians.

As strict partisans of the principles of the Parisian fa Jean Riolan (1577-1657) and Guy Patin (1601-1672), preëminent. Patin, "polemical medical man and humorist of that day," said of Riolan that he would

her systems, might rather be called a systemic phantasy."
;ystem is based upon the elements of chemistry—the
·ed successor of alchemy and the first step toward true
;try—; upon the new knowledge of the circulation of
ɔod; and upon the closer acquaintance with the chyle
mph vessels (which had been acquired in this period),
l as upon the old doctrine of the "spiritus and the
nnatus" of the heart. His system, although its author
professes to accept only "experience by means of the
is constructed far less upon experience than upon
ɔnclusions drawn from experimental observations, whose
tion with his theory is on the whole arbitrary and
" (J. H. Baas: Geschichte der Medicin.)
ɔsed to their beliefs were the theories of the Iatro-
natical school whose motto was, "In your practice,
ı not yourselves with theories." The originator of this
was Santorio Santoro (1561-1636), Professor in Padua
ɴice. Their idea was to treat all things with precision,
ıt all functions in the body were physical rather than
ıl. "Thus digestion was referred to as a process of
ııcal trituration, and the absorption of chyle was ex-
as due to the pressure arising from the action of the
ıal movements upon the comminuted food. In a similar
ɜ secretions were referred to as the resistance created
corners, curves, angles, etc., of the vascular system,
on."
Patin was a learned man, a brilliant writer and
;hly acquainted with the Latin language, which he
ɔ perfection. "His creed contained but two articles—
ɡ and purging with Senna." Certainly he was not a
ɔut with mediæval intolerance he opposed all who were
the existing order of things. It might have been of
ıt Molière has said "that a dead man is only a dead
ıd is of no consequence, but a neglected formality does
arm to the entire profession." Guy Patin strongly
in having his patients die "according to rule rather
recover in violation of it."
re ridiculed all physicians and all medicine. He had
respect for the "outside doctor"—him of Montpellier
he had for the members of the Parisian faculty. He
ecially venomous against the medical profession be-
their seeming ignorance and lack of skill. Suffering
d from a painful disease he became morose and dis-
vith the futility of prescriptions. Whether it was
n of the aorta or pulmonary tuberculosis, as has been
l by some, in any case, accompanied as it was by
ndriasis, it was sufficient to especially interest him in
ical factions of his day. He ridiculed all of them
lly.
·e's dramas against medicine began in his "barn
;" days. "The Flying Physician" and "The Physi-
Love" are two plays of inferior quality written by
ıatist at the very beginning of his career. The lat-
ıa is lost. In *Le Médecin Volant* we find Molière's
ck on medicine. Sganarelle, the famous rogue, under-

master in his love affair. He assumes the doctor's gown and talks with the pedantic air, which Molière thought was characteristic of the physician:

> **Hippocrates says, and Galen, by undoubted arguments, demonstrates that a person is not in good health when he is ill. You are wise to place all your hope in me; for I am the greatest, the noblest, the most learned physician in vegetable, sensitive and mineral faculty.**

Unlike other physicians he not only looks at the urine but also tastes it, but like them he is a stickler for formality. Upon being told his patient is dying, he exclaimed:

> **Ah! let her be careful not to do so; she must not amuse herself by allowing herself to die without a prescription from the doctor.**

This last remark, the author was very fond of repeating, and we find it again in 'The Physician in Spite of Himself.'"

In another of his farces "The Jealousy of Le Barbouillé" written during his provincial career the doctor is still more ridiculed. Le Barbouillé is plagued by a shrewish wife, who, as fate would have it, always gets the upper hand of him. The unfortunate husband seeks advice from a doctor, and like a good business man, accosts the physician and immediately comes to the point:

Le B: "I desire to beg for an opinion on a question of great importance to me."

The doctor, ever wakeful to the danger of losing his dignity, replies in what he endeavors to make a very reproving statement:

> **You must be very ill bred, very loutish and very badly taught, to speak to me in that fashion, without first taking off your hat, without observing *rationem loci, temporis et personæ.* What! You begin by an abrupt speech, instead of saying *Salve, vel salvus sis, doctor doctorum eruditissime.* What do you take me for, eh?**

No apologies will help. In endeavoring to excuse himself, poor Le Barbouillé gets more entangled. What astounds him most is that the doctor does not care for money. "Well, I made a mistake," he soliloquizes puzzled. "Seeing him dressed as a doctor, I felt that of necessity I must speak of money to him, but since he does not want any, nothing can be more easy than to satisfy him." The doctor is a very verbose individual who is continually advising his hearers to be brief. The stage direction in the seventh scene is interesting:

> **All wish to explain the cause of the quarrel: The doctor explains that peace is a fine thing. They all talk together, and make a dreadful noise. In the midst of all this Le Barbouillé ties the doctor by the legs with a rope, throws him down on his back, and drags him away. The doctor goes on talking all the time, and counts all his arguments on his fingers, as if he were not on the ground.**

Molière took a general interest in the educational affairs of France. In *Le Marriage Forcé* he throws a shaft at the University of Paris, which was endeavoring to persuade Parliament to confirm a sentence dated Sept. 4, 1624, which condemned to death all those who would dare to attack the Aristotelian doctrine.

Sganarelle meets two philosophers discussing and quarrelling. He accosts one, and is met with gibberish that he does not understand. "Devil take the scholars," he exclaims. "They will never listen to anybody. I see it was the truth I was told and that this Master Aristotle was a talker, and nothing else."

The doctor has a very good opinion of himself.

> Get along, you are more impertinent than the fellow who maintained that we ought to say the *form* of a hat instead of a *figure*, and I will prove it to you at this time, by the help of demonstrative and convincing reasons, and by arguments *in Barbara*, that you are and never will be anything but a simpleton and that I am and ever shall be, *in utroque jure*, the Doctor Pancrace. . . . A man of sufficiency, a man of capacity, a man finished in all the sciences, natural, moral, and political. A savant, savantissime, *per omnes modos et casus*. A man who has a knowledge suptriative of fables, mythologies, and histories; grammar, poetry, rhetoric, dialectics, and sophistry; mathematics, arithmetic, optics, ornicritics, physics and metaphysics; cosmometry, geometry, architecture, speculary, and speculatory sciences, medicine, astronomy, astrology, physiognomy, meteposcopy, chromancy, geomancy.

The doctor gets out of breath naming all these true and pseudo branches of learning. He is very intolerant of a diverse opinion, and would condemn anyone to the galleys or scaffold for contradicting him.

Molière ever attacks vice, undauntedly, uncompromisingly. He seems to fear to be too lenient with corruptions, lest he himself become indifferent. Pope well puts it:

> Vice is a monster of such frightful mien,
> That to be hated needs but to be seen,
> Yet seen too oft, familiar with her face
> We first endure, then pity, then embrace.
>
> —*Essay on Man.*

Not all the doctors of Molière are so indifferent in money matters as is the savant Pancrace of *Le Marriage Forcé*. In fact, the humorist rarely imagined a physician who was not absorbed in money making. He is not harsh with weaklings and sinners. He laughs at them heartily, and he expects us not to condemn his Sganarelles and Gros-Renés and Mascarilles. It is true that they are deep-dyed rogues but he smiles at their escapades and is very lenient with their delinquencies. Not so with the physicians and savants. There always seems to be something rankling in his heart against these learned men. He considered them hypocrites, fools, and villains. Humorist though he was, he never kept his sense of humor in dealing with doctors. Molière's suave and witty testimony cannot be accepted before a court of justice. Molière does not bear true witness.

Critics and editors of Molière always feel themselves called upon to defend the dramatist for his attacks on the doctors. Mr. Chatfield-Taylor in his admirable biography devotes a whole chapter to the strife between Molière and the faculty, and he covertly sneers at the College of Medicine, who, when they congregated, resembled more an assembly of Roman Senators than a meeting of French scientists. Professor Charles Heron Wall in his introduction to *Monsieur de Pourceaugnac* finds it necessary to state that "the attacks upon the doctors are not exaggerated." In their endeavor to defend the critics become partial and unjust.

Monsieur de Pourceaugnac is perhaps the best written, and Molière did not feel called upon to do but cause uproarious laughter. He does not attempt us with the sharp witticism of the comedian; employs the broad humor and crude jests of the clown.

M. de Pourceaugnac, a lawyer from Limoges, has Paris to marry Julia the daughter of Oronte. He is quainted with Paris and is easily led astray. Julia feel inclined to obey her father, and her affections are upon Eraste, a young fashionable gentleman. In circumvent the meeting between Pourceaugnac and Serigani the servant of Éraste persuades the countryman to place reliance on Éraste and himself. pecting, he is conducted to two physicians, who readily Serigani that Pourceaugnac is insane, and ignoring wretched man's protestations, they argue and debate usual pedantic style over the malady of their patient. consultation between the doctors is extremely witty. the senior physician has given a very lengthy and learned discussion of the case, the junior doctor, admiration, replies:

> Heaven forbid, Sir, that it should enter my thoughts anything to what you have just been saying. You have coursed too well on all the signs, symptoms and causes gentleman's disease. The arguments you have used learned and so delicate that it is impossible that he is not and hypochondrically melancholic; or were he not, that he to become so, because of the beauty of the things you have and of the justness of your reasoning. Yes, sir, you have cally depicted, *graphice depinxisti*, everything that apper this disease. Nothing can be more learnedly, judicious ingeniously conceived, thought, imagined than that you delivered on the subject of this disease either as regards diagnostic, the prognostic or the therapeutic, and nothing for me to do but to congratulate this gentleman upon fall your hands. All I should like to add is to let all his and purgings be of an odd number, *numero deus in pare* to take the whey before the bath, and to make him a plaster, in the composition of which there should be salt— the symbol of wisdom.

There is one thing about this comedy that is gratify the doctors and this is that Molière as pointedly attacks lawyers as he does the physicians. In fact, he ridicu men of law more than he does the practitioners of me They have a refrain which they are constantly reciting:

> Your deed
> Is plain and clear
> And all the gear
> Of wigs and law
> Upon this flaw
> One verdict bear . . . .
> Polygamy's a case, you find,
> A case of hanging.

Only one man who was not a doctor took up arms in of the medical faculty. Le Boulanger de Chalussay comedy entitled *Élomire Hypochondre, ou Les Médecins* *gés* in which he ridiculed Molière (Élomire) and his represents the doctors as learned men who take venge the mortal who has dared to attack the dignity of conservatives were extravagant in its apprecia-

death Molière despised physicians. His last comedy, *lade Imaginaire,* was written at a time when he was l and nearly dying. Molière himself acted the part of the imaginary invalid. This drama is very laughable. ory is very simple. Argan, the imaginary invalid, is itly employing a physician to prescribe for him. As ond wife says, "He is a wretch, unpleasant to everybody, seous dirty habits, always a clyster or a dose of physic body." His wife pretends great affection and diplolly so manages affairs that her husband should make ll in her favor, thus dispossessing her step-daughter que. Her plan would have been successful but for te the maid of the intended victim. Argan, desiring ice his doctor's bills, hits upon the remarkable scheme rying his daughter (who is in love with a young, handentleman) to his physician's son.

curtain rises upon Argan sitting alone and adding up thecary's bill.

> on the 24th, a small insinuative clyster, preparative and to soften, moisten and refresh the bowels of Mr. Argan—sous.
>
> on the said day in the evening, a julep, hepatic, soporiand somniferous, intended to promote the sleep of Mr. —thirty-five sous.
>
> on the 26th, a carminative clyster to cure the flatulence Argan.—thirty sous.

more, and still more. A goodly list and quite lucrative medical man in this case.

n the intended son-in-law, who is to receive his doctor's in three days, comes to visit the Argan family, he positively that he is invested with great learning. He es the step-mother for Angélique and pays her complintended for his belamour. His father, Doctor Diafoirus, tantly prompting him as to good manners and fashioniquette. His father, in praising him, says:

> ll disputations has he rendered himself formidable, and no passes but he goes and argues loudly and to the last exn the opposite side. He is firm in dispute, strong as a his principles, never changes his opinion, and pursues an at to the last recesses of logic. . . . . But, above all, what me most is his blind attachment to the principles of the , and that he would *never listen* to the pretended disof our century concerning circulation of the blood and inions of the same stamp."

her words, asinine obstinacy is the marked characterthe future practitioner. In reading these lines we are d of the famous hero of Butler's panegyric on Puritanudibras, likewise, was strong in debate:

> He was in logic a great critic,
> Profoundly skilled in analytic;
> He could distinguish and divide
> A hair 'twixt south and southwest side;
> On either which he would dispute,
> Confute, change hands, and still confute.
> He'd undertake to prove by force
> Of argument, a man's no horse;
> And that a lord may be an owl;
> A calf an alderman, a goose a justice,
> And rooks, committeemen and trustees.
> He'd run in debt by disputation.
> And pay with ratiocination,
> All this in syllogism true,
> In mood and figure, he would do.
> (Hudibras, Part I, Canto I.)

The young doctor is very gallant. He graciously invites his lady-love to amuse herself by assisting at the dissection of a woman upon whose body he is to give lectures; a new and improved method of gratifying the desire for fun in a young girl!

Once M. Argan refuses to take a prescription of his physician. The latter does not seem at all pleased about it:

> What daring boldness; what a strange revolt of a patient against his doctor! . . . . A clyster which I have had the pleasure of composing myself, invented and made up according to all the rules of art. . . . . A case of high treason against the faculty.

The final scene is an interlude representing the admission of a student to the degree of doctor of medicine. The scholars and professors recite a piece composed of dog-Latin and French praising medicine, and in a burlesque manner they march on the stage with clysters and bleeding pails. Their refrain is:

> *Clysterium donare,*
> *Postea seignare,*
> *Ensuita purgare.*

Really not a bad remedy for all diseases.

Like Rabelais before him, Molière always makes us laugh, but more than that he makes us think. Undaunted, he stood alone and battled with those in authority. Their endeavors to harm him proved fruitless and he escaped unscathed. Undoubtedly Molière had great influence upon his contemporaries and we notice great improvement in the proceedings of the Medical Faculty in the early part of the eighteenth century. We should not consider Molière as an enemy of medicine, but as a critic of the ignorance and intolerance of the medical practitioners.

REFERENCES.

J. H. Bass: *Geschichte der Medicin* (Henderson), 1889.

J. Paget: *Geschichte der Medicin,* 1898.

G. F. Fort: History of Medical Economy during the Middle Ages, 1883.

E. Issensee: *Die Geschichte der Medicin und ihrer Hülfswissenschaften,* 1840-1845.

J. Freind: History of Physic to the beginning of the 16th Century, 1727.

Stephen Paget: Ambroise Paré and His Times, 1897.

H. C. Chatfield-Taylor: Molière, 1906.

F. Funck-Brentano: *Die Aerzte Molières, Deutsche Review,* 1903, XXVIII, 192.

W. J. Conklin: A Page of Medical History; Transactions Ohio State Medical Society, 1891.

Molière's Works edited by H. C. Wall, 1876-77.

Molière's Works edited by Henri Van Laun, 1875-77.

Encyclopedia Britannica, IX Edition.

La Grande Encyclopédie Française.

Brander Mathews: Shakespeare and Molière: North American Review, 1910, CXCII, 351.

THE NEW DEPARTMENT IN THE JOHNS HOPKINS UNIVERSITY.

"ART AS APPLIED TO MEDICINE."

By Max Brödel,
Associate Professor of Art as Applied to Medicine.

The illustrations of medical publications are as a rule far below the standard set by other publications, both in regard to the correctness of the pictures and their artistic merits. In many instances, in fact, medical illustrations do not aid the text, but rather obscure it, and are often crude in the extreme. Illustrations of medical books are a highly specialized form of art, requiring on the part of the artists not only reliable draughtsmanship and adequate technique, but also a thorough understanding of medicine in most of its branches. It is obvious that a medical illustration can never be a success if the artist does not fully comprehend the object which requires illustration. It is hopeless here more than elsewhere in art for an artist to attempt to draw or paint an object of which he has no clear conception. Such a conception is absolutely necessary because it serves to create a picture in the artist's mind which must be the forerunner or model of the actual picture afterwards upon his paper. Upon the clearness of this mental picture depends the scientific as well as the artistic value of the drawing, for only under this condition can the artist's hand work with freedom and precision.

All medical illustrators of the present day are self-taught, because hitherto there has been no school where instruction in this important branch of art could be obtained. Most of them have been compelled to go through a long and tedious period of self-instruction marked by many failures. Their development has for the most part been a process of groping in the dark with an occasional success in the latter part of their career. Some of the best have died without having had an opportunity to train a successor, and the experience they have gained and the methods they have gradually evolved have thus been buried with them. No science, no art can ever develop to a high degree unless a new generation can base its methods upon the work of the last generation and thus profit by the failures and successes of others.

For this reason a department has been created in the Johns Hopkins University to be known under the general title "Art as Applied to Medicine." Its purpose is to bridge over the gap existing between art and medicine, and to train a new generation of artists to illustrate medical journals and books in the future and to spare them the years of trial and disappointment of their self-taught predecessors. In view of the fact that medical illustrating is midway between art and medicine, it is proposed that the instruction given be designed for the needs of two classes: (1) For medical students, and (2) for artists. Experience in the past has taught us that promising pupils can be obtained from both medical students and artists.

The following is the plan according to which the proposed course will be given:

A. Courses for Medical Students.

1. A course of lectures to first-year class for one hour a during the first trimester. This course is intended general instructions in the elementary principles of and sketching as an aid to the study of medicine.
2. A short course in artistic anatomy to be given durin second trimester. The purpose of this course is to ment the study of the cadaver in the dissecting room
3. A course in actual drawing open to students of the classes, to research workers and to members of the for two hours twice a week throughout the year. This will be limited to 12 students.
   The work will first deal with the exact study of the representation of medical objects of all kinds. Later will lead to the study of diagrammatic drawings and useful in taking medical histories or illustrating with blackboard sketches. Lastly, a suitable techni making medical illustrations for publication will be
4. Research workers who require pictorial representation research will be taught the principles of making such ings.

B. Courses for Artists and Art Students.

1. Special instructions to medical illustrators who desire to up advanced work in a particular branch. The fee pend on the length of the course and the character instructions. Minimum fee $25.00. Such courses may taken at any time during the academic year.
2. A regular course for beginners. This course will during the entire day throughout the academic year (Oc 1-May 31).
   Applicants who are not graduates of an art school must mit samples of their art work. The duration of the course will of necessity depend on the talent of the vidual, the average term, however, not exceding two The fee is $100.00 a year.
   Drawings of especial merit may be accepted and utilized the department for publication and as a practical test of artist's ability. Although such drawings become the erty of the school, the student will receive several proofs after publication. All drawings and sketches honored will remain the property of the student. The course will be as follows:
   a. Anatomical studies of the skeleton, muscles and from the standpoint of the medical illustrator. thing studied is sketched or drawn.
   b. Studies of fresh material at autopsies combined microscopic studies of the various tissues in and disease. A number of accessory methods employed in studying fresh tissues.
   c. Studies of hardened specimens from the various logical collections combined with the study of texture of the individual structures of the body
   d. Based on the foregoing the student is ready to the pictorial representation of physical examina various kinds of treatment, and the different ste surgical operations.
   e. Stress will be laid on the correct attitude of the medi illustrator toward problems in medical research toward the conception of a medical illustration general as an aid to the text and also as a work
   f. Parallel with and supplementing these studies instructions and demonstrations in the various niques suitable for medical illustrations intended publication. These are:
      (1) Half-tone drawings in crayon, etc.—Mixed nique.
      (2) Water-color painting.
      (3) Line drawings in pen and ink. Diagrams
      (4) Charts for class demonstrations.
   g. Studies of the various methods of reproduction the standpoint of the illustrator.

The Johns Hopkins Hospital Bulletins are issued monthly. They are printed by the LORD BALTIMORE PRESS, Baltimore. Subscriptions,
a ye postage, 50 cents), may be addressed to the publishers, THE JOHNS HOPKINS PRESS, BALTIMORE; single copies will be
-five cents each. Single copies may also be procured from the BALTIMORE NEWS CO., Baltimore.

BULLETIN

OF

HE JOHNS HOPKINS HOSPITAL

Entered as Second-Class Matter at the Baltimore, Maryland, Postoffice.

XII.—No. 248.] BALTIMORE, OCTOBER, 1911. [Price, 25 Cents

CONTENTS.

PAGE
lem of Typhoid Fever in Baltimore. (Illustrated.)
Wm. W. Ford, M. D., D. P. H., and E. M. Watson, A. M. 351

nt Epidemic of Diphtheria in the Johns Hopkins Hos- and Medical School: General Procedures Adopted.
Wm. W. Ford, M. D., D. P. H. 357

of the Urinary Tract by the Bacillus Lactis Aerogenes, a Consideration of the Mode of Entrance of Bacteria the Bladder. (Illustrated.)
John Arthur Leutscher, M. D. 361

PAGE
Combined Adenocarcinoma and Mixed-Celled Sarcoma of the Ovary. (Illustrated.)
By Ernest K. Cullen, M. B. 367

The Blood-Picture in Hodgkin's Disease.
By C. H. Bunting, M. D. 369

The Transplantation of Free Flaps of Fascia. An Experimental Study. (Illustrated.)
By John Staige Davis, M. D. 372

Notes on New Books 381

THE PROBLEM OF TYPHOID FEVER IN BALTIMORE.

By William W. Ford, M. D., D. P. H.,
Associate Professor of Hygiene and Bacteriology, The Johns Hopkins University.

AND

E. M. Watson, A. M.

(From the Laboratory of Hygiene and Bacteriology, The Johns Hopkins University.)

g the past year the city of Baltimore has suffered erious and costly epidemic of typhoid fever. From 1, 1910, to January 1, 1911, 235 deaths from this vere reported to the Board of Health, while for the e the total number of cases equaled 1890. The ma-

I.—Typhoid Fever in Baltimore, January, 1910, to June, 1911.

e Incidence.	Deaths.		Case Incidence.	Deaths.
ı. ... 39	7	1910.	Oct 359	42
). 25	11		Nov. ...251	37
r. ... 30	12		Dec. ...106	26
il .. 22	4	1911.	Jan. ... 55	11
y ... 31	2		Feb. ... 31	3
e ... 46	8		Mar. ... 35	5
y ...110	7		April... 44	8
t. ...473	30		May ... 56	7
t. ..398	49			

hese cases developed during the summer and autumn is shown on Charts I and II. Up to July 1 but 44 193 cases had been found, but beginning with this disease began to show a greater prevalence. During aths and 110 cases were reported; during August, 30 deaths and 473 cases; during September, 49 deaths and 398 cases; during October, 42 deaths and 359 cases. The two subsequent months, November and December, showed some falling off in both case incidence and fatality, 37 deaths and 251 cases occurring in November and 26 deaths and 106 cases in December. As the cold weather of 1911 became more settled the cases diminished in number, 55 cases and 11 deaths appearing in January, 31 cases and 3 deaths in February, and but 35 cases and 5 deaths in March.

During the year 1909 there were 136 deaths from typhoid and 1069 cases; during 1908, 180 deaths and 1426 cases; in 1907, 230 deaths and 1417 cases. Thus the year 1910 shows more typhoid fever than does any previous year for a considerable period of time. The number of cases recorded in the Department of Health is the largest since vital statistics have been kept in Baltimore, and the number of deaths is only equalled by the figure for the year 1890, when 247 fatalities from this disease were reported.

The deaths in the summer and autumn months also show a great increase over the corresponding months of last year. In 1909, 20 deaths occurred during August, but in 1910 this rose to 30. For September the number rose from 24 to 49; for October from 23 to 42; for November from 10 to 37; while in December the deaths rose from 9 to 26, as is shown in Chart III.

Chart II.—Typhoid fever in Baltimore. January, 1910, to June, 1911. Case incidence.

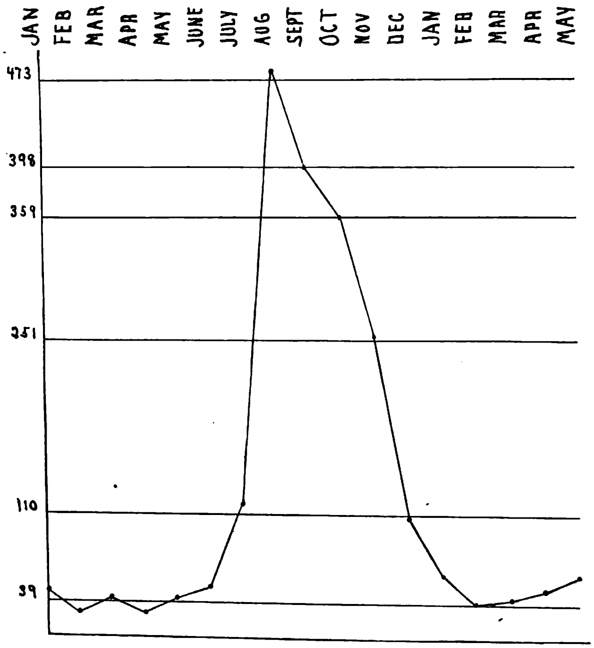
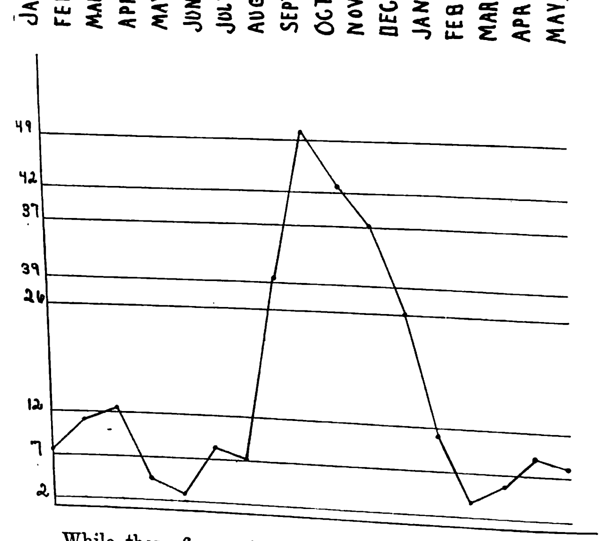


Chart III.—Typhoid fever in Baltimore. January, 1910, to June, 1911. Mortality.



While these figures indicate an increase in typhoid fever during the year just past, compared with preceding years, it must not be supposed that this predominance of the disease in any one particular period has not previously been in the year 1907 there were 230, and in the year deaths. As can be seen from Chart IV, typhoid always existed in the city of Baltimore. Deaths first reported officially to the Board of Health 1875. At the end of this year 187 deaths were this cause. Since then statistics of the Department a constant recurrence of the disease from year to the earlier years the diagnosis did not rest upon grounds as at present, the possibility existing that laria and early tuberculosis might be included among diagnosed as typhoid. Gradually, however, as the tology of the disease became better understood, as the of malaria and tuberculosis was more frequently evidence of the parasites and not merely upon the and finally as the Widal reaction was introduced,

Chart IV.—Typhoid fever in Baltimore.

Average deaths 1875 to 1880 .... 183 per
Average deaths 1880 to 1885 .... 167 per
Average deaths 1885 to 1890 .... 162 per
Average deaths 1890 to 1895 .... 207 per

Year.	Cases Reported.	Deaths.	Per cent.	[illegible]
1895	260	173	66.53	[illegible]
1896	472	188	39.83	[illegible]
1897	363	189	52.06	[illegible]
1898	545	189	34.68	[illegible]
1899	462	153	33.11	[illegible]
1900	871	189	21.70	[illegible]
1901	792	141	17.80	[illegible]
1902	1086	220	20.26	[illegible]
1903	768	189	24.61	[illegible]
1904	916	199	21.72	[illegible]
1905	1019	197	19.33	[illegible]
1906	1215	183	15.06	[illegible]
1907	1417	230	16.23	[illegible]
1908	1426	180	12.62	[illegible]
1909	1069	136	12.72	[illegible]
1910	1890	235	12.43	[illegible]

the recognition of typhoid infection much more returns made to the Board of Health have become more accurate. Despite the fact that some of the merly considered typhoid fever would now be this group, the figures indicate that there has been diminution in the amount of this disease in the city more, as compared with our increasing population. we had possibly the largest number of deaths ever known here, 247 in an estimated population But since then the number of deaths has diminished the smallest number being reported in 1909, 136 mated population of 580,000.

Beginning with the year 1895 typhoid fever able disease in Baltimore, and since then our become still more exact. In that year 173 ported, and 260 cases, a mortality percentage of notifications sent to the Board of Health have ally, the ratio of death to case incidence constantly in the year 1908 it became 12.62%. That is, from 7 to 20% and in private practice from 5 to 12%, e usual figure for estimating the number of cases of ., based upon the number of deaths, is 10%, it is evident have in Baltimore at the present time very complete for this disease.

officials of the Board of Health, particularly Dr. Jones . Stokes, have been interested in this complicated and problem of typhoid fever for some time, and in the report issued by Dr. Bosley for the Health Department 7, Dr. Jones has considered the matter at great length observations that can be made upon the disease here art with his paper as the basis.[1]

scussing this question, Dr. Jones came to the conclusion possible sources of our typhoid might be named:

1. Bathing in polluted water.
2. Privy wells.
3. Flies.
4. Importation.
5. Contact.
6. Hydrants in yards.
7. Water wells.
8. Raw foods.
9. Milk.
10. Drinking water.

we now come to a consideration of these possible we are confronted with apparently a hopeless task. tors which enter into the situation are so diversified, ormation concerning the disease in general is so de- n those very points which are of prime importance in ing the problem, especially the conditions which gov- life history of the responsible parasite outside the body, that with the evidence at hand it almost seems h any deductions which we can make must be based ufficient grounds. Investigations of typhoid fever in ies where the conditions are not unlike those in Balti- ecially in Washington and in Richmond, while fruit- tifically and slowly solving the problem for those com- , nevertheless do not give us conclusions which can d without great caution to our own city. The prob- entially one which must be worked out by each center tion for itself.

phoid fever may be said to present three definite as- irst, it has existed in Baltimore from the earliest ctuating somewhat from year to year, never falling ertain level, but occasionally rising above this level t, as in the year 1910, where it may be regarded as Secondly, the disease arises essentially as a result onditions. There is little or no evidence that our ever is imported from other districts. We have in the very influences which lead to its continuous prop- Thirdly, with the exception of the year 1906, when ll epidemics occurred during the colder months and y due to polluted milk supplies, the cases occurring ittle winter typhoid compared with our *marked summer rise.* Chart I for the year 1910, prepared from the Board of Health Reports, shows this very clearly. But it must be remembered that the variation here represented is not characteristic of any particular year, but represents a distribution of the disease by months which is peculiar for our typhoid. While we usually have but few cases of the disease in the winter months, it never disappears entirely. *Typhoid fever with us is a winter as well as a summer disease.* With the onset of warm weather, however, the case incidence and the number of deaths show a very rapid increase. During July the figures for both run up rapidly; during August they increase still more and the maximum is reached usually in September or in October. With the beginning of cold weather in the autumn the number of cases begins to diminish; this diminution becomes marked in November and December, but at no time do the cases entirely disappear. During the months of January, February, and March the disease remains quiescent only to break out again during the next warm season with the most dreadful certainty. A repetition of the summer epidemic each year can be predicted with absolute confidence.

We have thus two constants, the *continued presence* of the disease in Baltimore, and the *marked seasonal variation.* Dr. Jones, in considering the ten possible sources of typhoid fever which we have previously mentioned, has been able to eliminate such factors as bathing in polluted waters, well water, hydrants in yards, privy vaults and importation, from responsibility as epidemiological factors. Five possible sources of typhoid remain for us to consider.

1. *Raw foods.*—A number of articles of diet which are eaten raw, such as shellfish, vegetables and fruits, are popularly supposed to be intimately associated with enteric fever, and there can be no doubt that the typhoid bacillus may be carried by uncooked foods in certain special instances. Typhoid due to oysters polluted with sewage has been reported by Conn[2] and recently Buchan[3] has called attention to the serious contamination of the shellfish sold in Birmingham, England, and has indicated their importance as a possible source of the disease. As far as oysters are concerned in Baltimore, they may probably be eliminated from responsibility. Our typhoid is at its lowest ebb at the very time when oysters are consumed in the greatest quantity and has its especial prevalence in the months when the sale of the bivalve is forbidden by law. While raw fruits and uncooked vegetables may play a part in the spread of the disease, no satisfactory proof of this has thus far been presented.

2. *Contact.*—Our knowledge of the "chronic bacillus carrier" and the disastrous results which follow his entrance into a family or into a community has served to again emphasize the importance of contact infection in enteric fever. The many investigations in Germany, England, and in this country, especially in New York and Washington, indicate how many of our typhoid patients have previously come into close association with cases of the same disease, especially in its milder forms. They also serve to show that many attacks

---

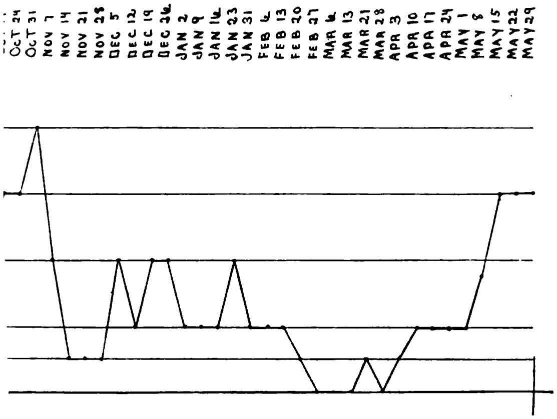
which on first consideration cannot be explained on the basis of contact, on careful study and search are apparently clearly the result of a more or less intimate connection with previous cases. In this city we may probably have underestimated the proportion of cases of this character, and Baetjer[4] has recently called attention to the important rôle which contact may play in our country typhoid, reporting 17 cases in two houses. During the past summer direct infection may have had a very significant part in spreading the disease, especially in the poorer sections of the city. The newspapers frequently stated that several cases had been found in one house or in one family. In a certain instance an extraordinarily large number was reported from a block of houses on East Chase street, and here the infectious material seems to have been transmitted directly from person to person. In general, however, the records of the Health Department indicate that in the majority of instances the cases of the disease occur singly in houses, but a small number of two-case and three-case houses having been discovered. Furthermore, we have typhoid summer and winter alike and the factor of contact infection will not explain the great increase of the disease in the summer months—that is, the marked *seasonal variation* or *summer rise.*

3. *Flies.*—One of the most attractive and plausible theories to explain a great prevalence of enteric fever in any community during the hot days of summer is to attribute the spread of infection from individual to individual to the agency of flies. The work of Levy and Freeman[5] in Richmond, where a campaign directed against the fly seemed to be effective in limiting the cases of typhoid in that city, has been quoted far and wide and the conclusions reached by these authors frequently applied to such cities as Washington and Baltimore, where the climatic conditions and character of the population are almost identical with those of Richmond. The importance of the house-fly as the carrier of infection has also been emphasized by Jackson[6] in New York, in seeking an explanation for the cases which appear in that metropolis. Still it must be remembered that in this city we suffer from typhoid not only during the fly season but during many months of the year when responsibility cannot be fastened upon these pests. During the year 1910 we had 26 deaths from typhoid fever and 106 new cases reported to the Board of Health for the month of December. While flies may be carriers of infection during the season when they are especially abundant and may thus explain the increase of the disease during July, August and September, they can play but a subsidiary rôle in the cases which occur during the winter, the early spring, and the late fall. Furthermore a great deal more knowledge as to the life-habits of these insects and the occurrence and distribution of the various species in Baltimore must be obtained before we can justly conclude that their activities are important epidemiological factors in this community.

4. *Milk.*—The milk supply of Baltimore comes from a wide district of farming land in the more or less immediate vicinity of the city. It is handled by a number of dairy companies which either produce it on their own premises or collect it from small farmers, and then ship it in bottles or in lar holding a number of gallons, to the principal railroad During transit no attempts at refrigeration are made. the stations in the city it is distributed in wagons fro to house or sold directly to the consumer in the little persed through the poorer sections of the community siderable time necessarily elapses between the hour of and the ultimate consumption of the product. The dairies often handle milk from a number of different this milk being mixed in bulk and again parceled out quantities. As a result the individual samples sold counter may sometimes represent milk collected fro scattered areas. The inspection of milk in the city wisely carried out by the officials of the Health Dep and is as effective as the present laws permit. Still and thorough regulation of the traffic at the proper is, on the premises of the farmers who make a busine ducing the milk, is not possible. The larger and more ous milk dealers have adopted the modern sanitary which ensure cleanliness and are making conscientio to furnish our citizens with a product which will present-day demand for milk of a proper chemical com and a low bacterial count. In many of the small ever, where milk is sold by the quart, pint, or even the filthiest conditions prevail. Refrigeration is regarded as necessary or the measures which are ca are of little value in maintaining the milk at a low ture. The milk cans are frequently opened as the milk out to the consumers one after another, and since th where the milk is sold are often the living rooms of family, it is thus exposed to contamination of va scriptions.

For a number of years now we have been making examinations of the milk found in the poorer quarte city in the vicinity of the Johns Hopkins Hospital these examinations have not been made through th year, nor with sufficient frequency to furnish pos clusions, they indicate clearly that much of the milk poor people is badly polluted. The bacterial count runs up into the millions and is uniformly above even liberal standards of purity. Recently one of our students, Mrs. de Angulo, has been making weekly tions of samples of milk collected in East Baltimore. instances she has found 50,000,000 bacteria to the meter. In a number of cases the count varied from to 25,000,000, and in nearly every sample obtained shops where the milk is sold from milk cans the coun 3,000,000 or over. If such a degree of pollution is ing the winter months, what must be the amount of life in this product in the hot summer weather? tremely dangerous conditions are found, of course certain regions and in the small shops. The bett furnished by the better dairies shows usually a low count, and indeed certain companies furnish milk wi *ater.*—The far-reaching importance which must be at- to the Baltimore City Water Supply as a source of our l fever has previously been indicated. Our water is from two main streams, the Gunpowder River and Falls. For many years we have made a study of the vder water and have demonstrated with great regularity is and constant pollution in it.[7] *Bacillus coli* can always ined in the majority of 1 cc. samples examined. It is itly present in a dilution of 1/10 and rarely in higher is, 1/100. Together with this organism there are many acteria of intestinal origin. *Bacillus alkaligenes,* which ly resembles the typhoid bacillus, is often found on the and certain liquefying bacteria such as *Bacillus cloacae,* may be regarded as characteristic of sewage, are oc- lly encountered. The bacterial count varies greatly, ap- y bearing some ratio to the rainfall and amount of 1 the reservoirs. It is usually somewhat under a thous- the cubic centimeter, but may exceed this number,

V.—Pollution of Gunpowder water. Fermenting organisms. October, 1910, to June, 1911.

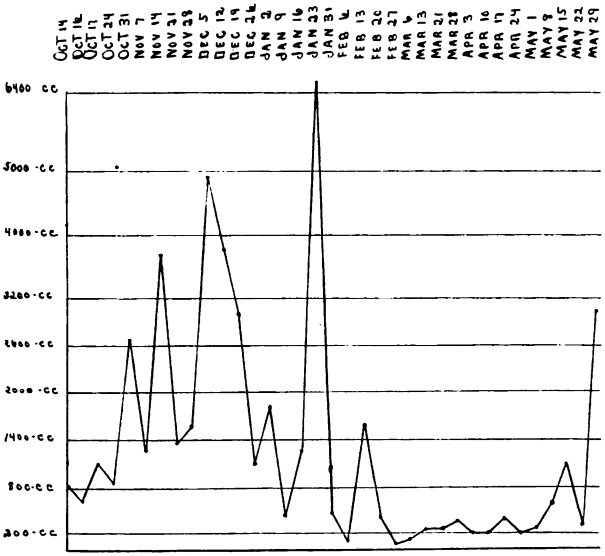


up to between ten and fifteen thousand. The tion of the water taken from the spigot thus shows ion which is of a decidedly serious character and lly permanent. The findings at the tap are amply d by the conditions which prevail along the water- the Gunpowder River. The sewage from numerous uses and small settlements of working people passes into this stream or into its tributaries, certain of otably Western Run, Beaver Dam Run and the Ore- ich, are grossly polluted.

okes at the Board of Health has obtained much the ults as ours in regard to the Gunpowder water. In he has made a special study of Jones Falls and Lake and he and Hachtel have even succeeded in isolating oid bacillus from Towson Run, one of the small which passes into the latter body of water.[8]

ing in October, 1910, when typhoid fever was raging Gunpowder water, estimating the extent of pollution by using the fermentation tube and by counting the number of colonies. The bacteria present at various periods have been isolated and submitted to careful study and identification, largely in the hope that we might determine the value which should be assigned to the presence of various liquefiers. As can be seen from Charts V and VI, the pollution of the water in October had reached a most dangerous grade. *Bacillus coli* or some other fermenting species was constantly present in a dilution of 1/100 and on one occasion in a dilution of 1/1000. The number of microorganisms was also much above that usually accepted as the standard of purity. At this time Maryland had been suffering from a prolonged drought, and the water in Loch Raven and in the Gunpowder was at the lowest ebb it had reached for years. The filth which is regularly present in the stream had evidently been greatly concentrated and the appearance of several thousand colonies to the cubic centimeter and especially the extraordinary degree to which the water could be diluted without causing the disappearance of the intestinal bacteria indicate how totally unfit for use the Gunpowder water was at this time. The pollution of this stream, which was then the main supply of the city, Lake Roland having been temporarily eliminated, continued excessive during the autumn months and early winter. Not indeed till February of this year did conditions improve, the bacterial count come down to normal and the intestinal microorganisms disappear from the fermentation tubes. Recently, however, evidences of sewage contamination are again shown by our studies and during the month of May, 1911, the Gunpowder water reassumed the filthy character it presented last October.

Chart VI.—Pollution of Gunpowder water. Bacterial count. October, 1910, to June, 1911.



DISCUSSION.

It may thus be seen that with the evidence at hand but an unimportant rôle can be assigned to raw foods, to contact infection, and to flies as epidemiological factors in our typhoid fever. While a certain proportion of our cases may be due to contact and while the number of cases may be augmented through the agency of flies in the fly season, the activity of these insects cannot be made to explain our winter typhoid, nor can the agency of contact explain our great summer rise. A combination of the two factors might be suggested to explain summer and winter typhoid alike, but the problem is not so simple and two other possible sources of infection must be considered. These other possible sources are *milk* and *water*. The milk supplied to the people of Baltimore, especially to the poorer classes, is frequently loaded with microorganisms and would not meet any reasonable requirements based upon a bacteriological examination. The regulations adopted by other cities if applied to Baltimore would probably stop the sale of much of the milk now offered in certain of the crowded districts of the city. This milk pollution is amply explained by the conditions on dairy farms, along the route of travel, and in the shops where the milk is sold. In the long and tortuous journey which the milk drunk in Baltimore must travel from the udder of the cow to the mouth of the consumer, this valuable and almost indispensable article of diet is exposed to frequent chances of contamination with dust, dirt and filth. The abortive attempts at refrigeration are manifestly insufficient to prevent the growth and multiplication of those microorganisms which find accidental entrance. If milk can serve as a source of typhoid fever, we have in the city of Baltimore at the present time ideal conditions for the spread of this disease. Furthermore, the very months of the year when the cases are at their maximum are those months when we can reasonably suppose that the life of the typhoid bacillus in milk will be considerably prolonged, namely, in the hot summer season. Moreover, several outbreaks of the disease in the winter months have been definitely traced to certain dairies, as in the year 1906. Whether the uniform distribution of the cases of typhoid over the entire city which is characteristic of Baltimore can be brought into harmony with milk-borne infection is not quite clear. It must be said, however, that the typhoid of Washington seems to bear a direct relation to the city milk supply, and yet the distribution of the disease in that city is fairly uniform and is similar to the distribution which has been noted here. Thus the utmost stress must be laid upon milk in considering the epidemiology of our typhoid and next to our water supply milk must be regarded as the factor of the greatest importance.

The serious and dangerous pollution of our city water, which has been emphasized by Dr. Stokes and by ourselves, may well be pointed to whenever the subject of typhoid fever is under discussion. That the contamination has been increasing markedly during the past two or three years is evident from the results of the many examinations which have been made. [illegible]perience in both Richmond and Washington, however, indicates how dangerous it may be to attribute fever to water supplies, even though the filtration of other cities or the change from a polluted to a pure been followed by a marked reduction of the typhoid. point of great importance has been brought out by the gations of the past year. The extent of pollution of the powder water, or the concentration of the sewage it, shows the same variation as does our typhoid fever. typhoid was as its height in September, October and ber of last year, and at this time the water used in was showing its maximum pollution. By December the ber of cases had come down markedly but not to our normal for this month. At the same time, the of the water had diminished in quantity. During the winter months the typhoid almost disappeared from and for this period the water showed comparatively age. With the onset of hot weather the pollution of the supply has again become excessive and the returns to the partment of Health indicate that our typhoid is also prevalent.

Whether this close correspondence or parallelism the amount of this disease in our city and the extent our water supply is polluted is anything more than cidence cannot be decided with the evidence at hand. parallelism is no proof of etiological relationship, and are able to eliminate water as a factor in the typhoid in Baltimore by the adoption of filtration its sterilization or disinfection we will not be in a explain the disease satisfactorily. For the present the has only a theoretical interest. Our constantly and tently polluted water must be regarded for the present main source of our typhoid fever. It is absolutely for the health of the citizens of Baltimore that the gent regulations be enforced in controlling our water and that every effort be made to hasten the construction sand filters now being prepared for the Gunpowder Until these filters can be utilized the water should be by the addition of some chemical disinfectant, the hypochlorite or bleaching powder method.

BIBLIOGRAPHY.

1. Annual Report of the Sub-Department of Health for the
Baltimore for the year 1907, p. 44.
2. Conn: Med. Rec., 1894, XLVI, 743.
3. Buchan: J. Hyg., 1910, X. 569.
4. Baetjer: Johns Hopkins Hosp. Bull., 1909, XX, 152.
5. Levy and Freeman: Old Dominion J. M. and S.,
315, 411.
6. Jackson: Pollution of New York Harbor as a
Health by the Dissemination of Intestinal Diseases
the Agency of the Common House Fly. A Report by
B. Jackson to the Committee on Pollution of the
Association of New York.
The House Fly at the Bar. Indictment. Guilty or not
The Merchants' Association of New York, July,
7. Ford: Johns Hopkins Hosp. Bull., 1911. XXII, 53.
8. Stokes and Hachtel: Arch. Int. Med., 1910. VI, 121.

HOSPITAL AND MEDICAL SCHOOL: GENERAL PROCEDURES ADOPTED.*

By William W. Ford, M. D., D. P. H.,

Associate Professor of Hygiene and Bacteriology, The Johns Hopkins University.

ing the last week in January and the first two weeks of
ry of this year (1911) a number of cases of diphtheria
d in the Johns Hopkins Hospital and Medical School.
nuary 25, a pupil nurse with the disease was admitted
Isolation Ward, and on February 3 a patient in the
ward, Ward F, developed clinical symptoms of diph-
and a throat culture showed the Klebs-Loeffler bacillus.
s immediately isolated and no further cases appeared at
me in the ward from which he was taken. On February
upil nurse in charge of the children in Ward G, the
and children's ward, developed diphtheria and on the
ng day an employee in the baggage room was found
infected throat. These cases all presented the clinical
of a mild type of the disease and rapidly recovered.
bruary 11, a child in Ward G, an old burn and skin-
g case, exhibited a bloody nasal discharge. It had been
and ailing for some time and the attention of both
and nurses had been directed to its condition. When
charge appeared it was at once examined and the di-
of nasal diphtheria established. This infection proved
irulent in character, the child dying, despite the vigor-
of antitoxin. It had evidently had the disease several
fore clinical symptoms were noted. No idea that the
on would spread was then entertained, but on February
more cases developed in children in the same ward,
, and two days later a fourth-year student on duty as
al clerk in this ward was found infected with the
ristic organism. In a period of twenty-two days eight
the disease had thus made their appearance, five of
cated in Ward G, three in children patients and two in
als rendering assistance in the care of these patients.

number of cases of diphtheria was by no means out
rdinary, either for large general hospitals of the size
Johns Hopkins or for this Hospital itself. We have
had an occasional Klebs-Loeffler infection and shall
xpect such sporadic cases. We live in a community
iphtheria is ever present, and the extension of the out-
ection to the Hospital is never unexpected, nor is it
matter of concern. But when the Clinical Clerk on
was found with the disease, and it was realized that
er cases had developed in the children on the same
was suspected that the infection might have spread
ore or less systematic examination of patients, nurses
ents in this ward was carried out. No cases were
ght to light, but four days later another fourth-year
n Ward G was found infected. This was on February 20, and on the following day diphtheria was discovered in three adult patients in Ward G, in three nurses in this ward, in another nurse, a room-mate of one of the infected Ward G nurses, and in a nurse in the general operating room, who had handled Ward G patients.

This more or less sudden outbreak of diphtheria in Ward G, or rather this sudden spread of the contagion, was viewed with great uneasiness by the medical internes and especially by the Resident Physician, Dr. Sladen, and by Dr. Austrian, who had been examining the cultures. The occurrence on one day of eight cases of diphtheria associated with one ward indicated a firmly seated focus of infection and a by no means remote possibility that this infection would spread in a number of directions. The very free access to the wards which our students enjoy added to the body of patients, doctors, nurses and attendants who might become infected, another fairly large and somewhat widely distributed group of individuals who could carry infection to various points. Actuated by a well justified concern, on February 21, after these eight cases of diphtheria were discovered, the Resident Medical Staff instituted a systematic examination of the hospital population. The throats of all were carefully studied for local signs of infection, and on the slightest appearance of suspicious symptoms the individuals were segregated and cultures taken. The following day three more cases of diphtheria were brought to light, an adult patient, a nurse in Ward G and a medical interne in another ward. On Thursday, February 23, seven cases were discovered, two more children in Ward G, three nurses and a member of the second-year medical class. On Friday, February 24, eleven cases of diphtheria made their appearance, two more nurses, a patient in Ward F and eight medical students.

At this time the situation was regarded as extremely serious by all the men who were working on the wards. Cases of the disease were cropping out with great rapidity and in a number of different areas. It was evident that diphtheria had gotten a firm foothold in the institution. From January 25 to February 25 thirty-eight cases had developed. This was despite the fact that the cases were recognized early, the diagnosis established soon after the appearance of clinical symptoms, complete isolation of all the patients carried out and energetic cleaning and disinfection employed to rid the infected localities of the contagious material. In brief, all the measures which under ordinary circumstances are employed to prevent the spread of the Klebs-Loeffler bacillus had been adopted and yet the disease was steadily increasing in intensity. The occurrence on two days of eighteen cases of diphtheria was too serious a matter for both the Hospital and the

---

read at the 1911 meeting of the Interurban Clinical

Medical School not to be regarded with considerable uneasiness. It was furthermore clear that the disease was spreading in two directions, independently and simultaneously: first, in the group of persons associated with Ward G, patients, nurses and assistants, and individuals in the Nurses' Home, who had been in contact with the Ward G nurses; and, secondly, in the student-body of the Medical School. In regard to the first group of people two possibilities existed, one that a focus of diphtheria existed in Ward G, from which source it spread to the Nurses' Home, the other that a focus existed in the Nurses' Home, from which point it spread to the patients in the ward. In the second group, the medical students, cases had been discovered in all the classes and the appearance of a greater number in the first- and second-year students, who do not come into the hospital, than in members of the third- and fourth-year classes, who might be infected from ward cases, was a proof of the independent transmission of the disease among the students themselves. Various avenues by means of which the infection might be spreading in the student-body were suggested, the most probable channels being the Lunch Room in the basement of the Physiological Building, where about a hundred men and women from all four classes take their midday meal, and the various students' clubs and boarding houses.

At the meeting of the Advisory Board of the Medical Faculty on Friday, February 24, the many details of the situation were presented by Dr. Barker, and it was decided to close the Medical School. A committee was appointed to take charge of the situation. This committee, known afterwards as the Diphtheria Committee, consisted of Dr. Williams, Dr. Barker and Dr. Ford. Dr. Norton was asked to become an ex-officio member as the Acting Superintendent of the Hospital. It should be mentioned that only by the active and willing co-operation of Dr. Norton with this committee was it possible to carry out the various measures which were suggested to stamp out the disease. To the Diphtheria Committee all questions relative to the epidemic in both Hospital and Medical School were referred.

On Saturday morning, February 25, Dr. Williams, the Dean of the Medical School, posted notices stating that the institution was closed temporarily. Later notices were sent to all the students urging them to remain in Baltimore, to keep in close touch with the school authorities and to avoid appearance in public places like theaters and churches. On the same morning the Diphtheria Committee held its first meeting. The various features of the epidemic were discussed at length and certain general measures were decided upon. These measures included the further examination of all the Hospital inmates, patients, doctors, nurses, orderlies, etc., the taking of routine throat cultures from all the medical students, and the cleaning and disinfection of the medical buildings. An investigation into the conditions of the many boarding houses where the students live, to bring to light any hidden foci of infection, was also considered advisable, and Dr. W. L. Moss was asked to undertake this latter work.

At this time it was deemed of great importance close touch with the Department of Health of the Baltimore, and Dr. Moss and Dr. Ford, at the committee, had a long conference with Dr. Jones, Commissioner of Health. At this conference a plans of work were considered. Dr. Jones suggested the importance of taking throat cultures from all the of the students' boarding houses to determine whether fection was spreading or likely to spread to the city. the resources of the Health Department at the Moss in his investigation and made him a temporary of the Department. Dr. Jones expressed his great co-operate with the Diphtheria Committee in any way and all questions affecting the relationship of the the city, such as the discharge of patients, were mitted to him for decision.

On Saturday, February 26, six additional cases of developed and on the following Sunday eight more, members of the Faculty or their families. When mittee met on Monday fourteen cases had thus been the thirty-eight already reported, making a total of It was evident that the disease was spreading was therefore decided to close the Dispensary, to give it a thorough overhauling, and to patients to the Hospital except certain urgent cases to be warned of the danger.

By this time the various measures of cleaning fection, of taking routine cultures from the Hospital and Medical School population, the of individuals with positive throat cultures, the suspects, had been put in operation. It was some of the patients were rapidly recovering and be ready for discharge. A number of non-infected were also anxious to leave the Hospital. Dr. Jones fore appealed to, for a ruling in regard to the decided that the patients should be divided into and treated as follows: First, all persons who had from diphtheria could be discharged when two tures from nose and throat separated by a interval had been obtained. Secondly, all persons diphtheria and not contracting the disease could be when one negative nose and throat culture had been Thirdly, all persons not exposed to the disease when one negative throat culture had been secured. upon these rulings on Tuesday, February 28, Dr. posted notices in the Hospital and began the patients.

The cleaning and disinfection of the Medical put in charge of the writer and presented a special which may be considered briefly. The buildings divided into many rooms, devoted to all sorts of were in active use at the time of closure. The large corridors and stairways, establishing a free tion often between basement and attic seemed to gaseous fumigation valueless. Largely upon the [illegible] walls to a height of about six feet, after the build- had been allowed to rest absolutely undisturbed for 24 to ›urs to allow the dust to settle. Attempts which were to disinfect some of the rooms with formaldehyde gas ned from such preparations as briquets of formanganate patent candles which on burning evolve this vapor, nstrated the uselessness of the procedure. In a few min- ıfter the evolution of the gas had been brought about the of it had disappeared from the rooms, the many open- ıbout the doors and windows, the heating apparatus, and entilating shafts, permitting it to pass into other parts building. It was evident that some method of obtaining tinuous evolution of the gas lasting a number of hours be hit upon if an effective disinfection of these large ings was to be obtained. At the suggestion of Mr. ey, head janitor of the Anatomical Laboratory, this was accomplished by the long-continued boiling of ons of 40% formalin in water in the proportion of about ›art to three. The windows and doors of the buildings tightly closed, all the inside doors leading from the to the corridors opened and saucepans containing the ılin mixture were boiled over Bunsen burners in a num- f different localities. A constant evolution of the gas g six to eight hours was thus obtained, the atmosphere building being saturated with the vapor for a consider- ›eriod of time. The flames of the Bunsen burners were guished by turning off the main supply of gas in the ıent and on the following day the buildings were opened, ughly aired and the work of cleaning undertaken. The and walls were first washed with soap and water and viped off with some disinfectant solution, either a solution bolic acid or one of corrosive sublimate. Whenever the substance was used it was followed by another washing soap and water.

buildings where the presence of animals or expensive ıtus likely to be injured by the vapor of formaldehyde ıted this disinfection of the structure as a whole, the te rooms were sealed up and fumigated by the Parke formanganate briquets or by the Du Prey candles. rooms were kept tightly closed for 24 hours and then ›ors and walls were washed with soap and water and isinfectants.

›acteriological tests were made to determine the efficiency fumigation. The necessity for rapid work precluded tisfactory observations, and it was realized that no l of disinfection is perfect. It was decided to carry out rously as possible those methods which are recognized f the greatest value and to trust to a wise providence ıe contagion would be destroyed. Afterwards, when me was available, with Dr. Norton's help, a number of tions were made during the disinfection of Ward G. found that surface cultures of organisms like *Bacillus s, Bacillus coli, Streptococcus pyogenes, and Bacillus ısus* were killed when exposed to the gas generated by

Special emphasis was placed upon the disinfection and cleaning of the Lunch Room in the basement of the Physiological Laboratory. From the beginning of the epidemic it was believed that it might be one of the main foci of infection among the students. Primarily it was the only place where there was a general meeting of the members of all classes. Again, certain practices in vogue there, such as cleaning the table-tops with napkins left by students who had already taken their lunch and departed, seemed to offer an abundant opportunity for the spread of any contagious material coming from the throat. This room was therefore fumigated and washed thoroughly on two occasions separated by an interval of several days, and when finally reopened certain changes were instituted in the care of the dishes and napkins.

The students were encouraged to disinfect their own rooms, and in many instances were supplied with material from a quantity of disinfectant which had been sent to the school from the Department of Health. In all the students' club-houses and in the majority of students' boarding houses this procedure was carried out most energetically.

Certain special difficulties were met with in the work of cleaning. In the first place it was extremely hard to get labor because of the widespread fear of diphtheria which had been engendered in the minds of the various residents in the vicinity of the Hospital, partly because of the wide publicity which had been given the epidemic by the newspaper reports. In the second place it was believed that all the people working in the buildings would be exposed to infection with the Klebs-Loeffler bacillus and the problem of their proper care had to be met. Eventually, a sufficient number of active people were obtained to do the necessary work. No cultures were taken from the throats of these individuals during their time of employment. It was perfectly evident that if suspicion should arise that they stood in danger of infection under no circumstances could they be induced to remain at work. At the same time it was realized that these individuals should be carefully examined at the end of the period of cleaning and disinfection to determine whether any of them had become infected with the diphtheria bacillus. This work in the medical buildings was completed in about a week from the time it was started. On Saturday, March 4, cultures were taken from all the work-people, the extra employees were discharged, and the control of the buildings turned over to the Dean of the school. One positive throat culture was found in a woman who had been working in the Physiological Laboratory. It was not absolutely certain that this woman became infected in this building, since we had no negative throat culture at the time she began her work there, but the presumption was in favor of this source of her contagion. This case proved to be of considerable interest and importance. The woman harbored diphtheria bacilli in her throat for a period of fully 20 days, during which time she had no clinical symptoms or signs whatever. All sorts of measures were carried out to rid her throat of the organisms, such as spraying with various disinfectants and with antitoxin itself. She received as well the regular antitoxin treatment administered subcutaneously. Eventually two negative cultures from her throat were obtained by the officials of the Health Department, and she was discharged from quarantine. This was one of the few definite cases in this epidemic where the diphtheria bacillus remained for some time in the throat of an individual without causing the appearance of clinical symptoms.

The most perplexing question which the Diphtheria Committee had to decide was in regard to the use of prophylactic or immunizing doses of diphtheria antitoxin. This measure was discussed on a number of occasions. A large number, if not all, of the doctors and nurses in contact with the disease took this treatment soon after the epidemic broke out. It was a matter of great importance, however, to determine whether this procedure should be insisted upon with all the inmates of the Nurses' Home and with the members of the Resident Staff of the Hospital. The Health Department from the first had recommended prophylactic antitoxin as the only remedy which could be relied upon to stop the spread of diphtheria among the nurses. At the same time the administration of antitoxin is certainly followed in a few individuals by the appearance of disagreeable or untoward consequences and authorities are by no means agreed as to its value in checking epidemics. Relying upon several experiences in Baltimore where diphtheria has been stamped out of a number of institutions only when prophylactic antitoxin has been administered to all the inmates, upon reports from various hospitals for the care of contagious diseases in which this treatment is carried out as a routine measure with the children when diphtheria appears, and upon a number of publications as to the percentage of bad results which follow the use of antitoxin, the committee decided to recommend but not to insist upon this measure. Whenever antitoxin had been administered previously, wherever an authentic history of attacks of asthma could be elicited, contra-indications were recognized to the use of the remedy.

A careful record of the administrations of antitoxin was kept by Dr. Sladen and his staff. Over three hundred prophylactic doses were given, two hundred nurses receiving the treatment, forty-three students, and a small proportion of the resident staff. About seventy patients took curative doses of the remedy. Nearly all the individuals who received the antitoxin either for prophylactic purposes or to combat an existing infection with the Klebs-Loeffler bacillus developed some local signs. In most cases the reaction was limited to slight urticaria. In a few instances a pronounced œdema was noted with local tenderness and elevation of temperature in the dependent parts near the site of injection. In five cases characteristic serum disease appeared. In one of these cases, a fourth-year student, immediately following the injection of the antitoxin a typical anaphylactic shock developed with great dyspnœa, shivering, vomiting, and attacks of faintness with tendency to syncope. These symptoms lasted for a number of hours and eventually entirely disappeared. This student had received antitoxin previously and gave a history of asthmatic attacks in his youth. In the other four cases in but one or two instances had antitoxin been administered previously.

How far the prophylactic use of diphtheria antitoxin was instrumental in stopping this epidemic is not clear. A number of interesting facts were noted which indicate that it did have a definite effect upon the spread of the disease. The only nurse in Ward G who refused antitoxin later developed diphtheria. Among the other nurses on this ward who received the treatment no cases of infection appeared. Of the six children in Ward G, all exposed to infection, four received prophylactic antitoxin. Of these four, two later showed positive cultures of the diphtheria bacillus, but had no [illegible] symptoms. The two other children on Ward G, in whom it was not considered advisable to administer the antitoxin because of recent surgical operations, developed diphtheria later and died. Coincidently with or immediately following the general administration of prophylactic doses of antitoxin to the nurses in the Nurses' Home, the infection disappeared from this group of individuals, and it did not disappear until the measure was carried out. While thus no proof can be brought to show that this procedure was operative in controlling the infection, the majority of the men who administered the antitoxin and followed the cases of diphtheria afterwards were convinced that it had no little influence in checking the epidemic. At the same time the prophylactic use of diphtheria antitoxin is probably the one measure adopted which may not be carried out so vigorously should we have epidemics of diphtheria to deal with in the future. While in our experience no serious results developed from the use of this remedy there is a very general sentiment against it in both doctors and nurses, and this feeling is undoubtedly justified by the observations which have been published.

On Friday, March 3, it was apparent that the epidemic was dying out. From a case incidence of eight on the preceding Sunday, the number of cases had dropped irregularly during this week. Two cases in the nurses appeared on Monday, two cases were reported on Tuesday, three were found among the students on Wednesday, four cases developed on Thursday, one student, one nurse, one ward doctor and one orderly, and two came to light on Friday among the laundry employees. Altogether but eleven had developed in five days, and these had such a varied distribution as to indicate that they were but scattering cases at the end of a general epidemic. On Friday, therefore, Dr. Williams sent notices to the students and instructors that the school would open again to the first two years on Wednesday, March 8; to the last two years on the following day, at which time the dispensary was to be opened again to the public. Cultures were taken from all the students and instructors and only those with negative reports were admitted to the school. The exercises began again on Wednesday and by the latter part of the week the routine of the Medical School had been re-established in all the classes. The infected wards of the Hospital were cleaned and fumigated. The patients who had recovered were discharged and new patients again were received for treatment.

the decision to reopen the school was reached. Thus March 6 a child in the Maternity Ward was found with a itive nose culture, on March 7 a student developed a posi- throat culture, on March 16 another student showed the ection, and on March 19 one of the physicians in the dis- isary. On March 22 the room-mate of the last-named stu- it developed an otitis media which proved to be due to the bs-Loeffler bacillus. Since that time no cases have ap- red either in the student-body or among the individuals ng in the institution. Altogether 66 cases of diphtheria e treated in the Johns Hopkins Hospital, to which should added 6 cases in orderlies or members of their families who various reasons could not be treated in the Hospital but evidently contracted the disease there, a total of 72 cases. r deaths occurred, three in children and one in an adult, e of them, however, being uncomplicated diphtheria cases. Ve shall probably never know the source of this epidemic liphtheria. Baltimore always has cases of the disease, and imes during the winter season these cases may occur with e frequency. From these foci of infection in the city the ease frequently extends into the Hospital, but at no time viously has there been evidence of any wide invasion of the spital population, nor has the fear been felt that such an asion was likely to occur. In the three and a third years n September 1, 1907, to January 1, 1911, there have been forty-four diphtheria patients in the Hospital. These cases urred in individuals living in widely separated parts of the , of various ages and occupations. Occasionally several s have developed on or about the same time among the ses or among the medical students. Thus in May, 1908, e were 5 cases of this description. The infection died out during the next winter a few scattering cases appeared in eighteen cases of diphtheria admitted to the Isolation Ward, of whom six were in the Hospital population and two among the medical students. In 1910 there were altogether eleven cases, of whom four were nurses or pupil nurses in the Hospital. These cases occurred at longer or shorter intervals, and while they may have developed one from another, they may equally well have been simply extensions of the disease from the city. At no time was there any difficulty in controlling these infections, and at no time was there any fear that the disease would spread in our midst. This sense of security was rudely shaken by our recent experience, and the possibility that an infection of mild form and almost self-limited may at times assume the character of a rapidly spreading contagious disease will always be entertained here in the future.

Finally, the question arises as to whether the very drastic measures adopted to stamp out this epidemic were necessary and whether the cessation of cases was directly due to the introduction of these procedures. Such questions from their very nature cannot be answered. We can only say that at the time the measures were put in operation, diphtheria was spreading with great rapidity in the Hospital and Medical School. All the men intimately associated with the work, especially the members of the resident medical staff, were appalled at the way the cases were coming to light and it was generally believed that unless drastic measures were employed a widespreading and serious epidemic of diphtheria might develop in the institution. With the inauguration of the various preventive methods which were considered advisable the disease disappeared from our population, and we cannot help but believe that this disappearance stands towards our activities in the relation of effect and cause and not in the relation of a sequence of events.

INFECTION OF THE URINARY TRACT BY THE BACILLUS LACTIS AEROGENES, WITH A CONSIDERATION OF THE MODE OF ENTRANCE OF BACTERIA INTO THE BLADDER.

By John Arthur Luetscher, M. D.,
Instructor in Medicine, The Johns Hopkins University.

llowing the introduction of exact bacteriological methods och, there appeared, in addition to descriptions of mor- gy and motility, more or less accurate descriptions of ultural characteristics of the bacteria found in cystitis. om 1887 until 1892 a series of observations were made ench authors who found, in cystitis in man, a bacillus as ost frequent cause of cystitis. This bacillus appeared various names. Morelle[1] and Denys[2] identified it as the *tis aerogenes;* while it was later definitely proven to be other than the *B. coli communis* by Achard and lt,[3] Reblaud,[4] Krogius,[5] and later observers. Were it not for the fact that these early observations are still classed under the *B. lactis aerogenes,*[6] I should hesitate to give a more extended historical review.

A careful study of the originals in the light of present-day knowledge should leave no doubt as to the exact identity of this particular bacillus.

In 1887 Clado[7] isolated the "bactérie septique de la vessie," stating that this bacillus had not been described by any one.

This bacillus had rounded ends, and was actively motile ("movements of translation" as distinguished from "movements of place"); it travelled rather rapidly, in some instances across the field of the microscope, and did not stain by Gram's method. The colonies on plates had an irregular outline, and the agar slant had a thin, opalescent growth.

In 1888 Albarran and Halle[8] isolated the "bactérie pyogène" from 35 out of 50 pathological urines obtained aseptically from the bladder. This organism was found 15 times in pure culture, and 20 times associated with other organisms.

This bacillus was 4 to 6 μ long, with a diameter of 2 μ, had rounded ends, and was motile in young cultures, but did not stain by Gram's method. The colonies on plates had rounded borders, and looked like drops of wax. In the gelatine stick, the culture formed a white stem with a white hyaline layer on the surface. They concluded that their bacillus was the same as that described by Clado.

In 1889 Doyen[9] isolated from urine in cystitis 10 bacilli and 4 micrococci. Of the bacilli, 9 did not liquefy gelatine, nor had they any other characteristics to distinguish them from the "bactérie pyogène" of Halle and Albarran.

During the same year Rovsing[10] isolated the cocco-bacillus urea, from 3 of the 29 cases under observation. According to Schmidt and Aschoff[11] this bacillus was probably none other than the "bactérie pyogène" of Halle and Albarran.

In 1889 Morelle (loc. cit.) found a non-liquefying bacillus in 13 of 17 cases studied, of which 6 were in pure culture. This bacillus was small with rounded ends, sometimes ovoid, and very variable in length. Its size was always influenced by the media. The bacillus was possessed of "movements of translation." No spores were found. On agar the colonies were round, glassy, smooth, and if discrete, reached 4 mm. in size. When translucent, an exquisite design of concentric lines was often observed. He noted both the opaque and the translucent type, presenting a pleomorphism which would lead one to believe them to be different species. The growth on potatoes was white to yellow, and showed bubbles of gas. It coagulated milk in two days, with acid production. It fermented glucose, with formation of CO_2 and H.

He concluded that his bacillus was identical with (1) the "bactérie septique de la vessie" of Clado, (2) the "bactérie pyogène" of Albarran and Halle, (3) the cocco-bacillus urea of Rovsing, and probably with the 8 species described by Doyen.

After a careful comparison of the morphological and cultural properties, he concludes that his bacillus is none other than the *B. lactis aerogenes* of Escherich. In comparing it with the colon bacillus, he admitted that there was a great similarity, and that their pathogenic action was the same.

The differences cited were that the *B. lactis aerogenes* developed on gelatine into higher and more circumscribed colonies, with regular outlines; that they were white and more opaque, while the colon colonies were gray and translucent; also that the *B. lactis aerogenes* colonies were viscous, while those of the colon were more dry. He ends with the following sentence: "Still the similarity is great, and one may perhaps some day demonstrate that they are only two ties of the same organism."

Achard and Renault (loc. cit.) were the first to cal
tion to the identity of the "bactérie pyogène" and th
bacillus. They compared two strains obtained from Al
and Halle, one strain obtained by Gilbert and Girod
the bowels of a new-born, and various strains obtained
cases of pyelonephritis. All had the same morpholog
same motility under similar conditions, and the same
characteristics. They also found the pathogenicity the

At the same time Reblaud (loc. cit.) reported his
the previous year, from which he concluded that the
térie pyogène" is identical with the colon bacillus. Ch
took the same view.

In 1892 Krogius (loc. cit.) examined 17 path
urines from cases of cystitis, and in 12 found a small
bacillus with rounded ends, and of very variable dimen
The urine was acid, with a particularly fœtid odor. He
pared this bacillus with the "bactérie pyogène"
from Albarran and Halle and found them identical. In
into the bladder of rabbits, his bacillus produced the
symptoms of purulent cystitis as the "bactérie pyogène
also found that by growing the opaque type in sterilized
mal urine for several weeks, it was transformed in
transparent type.

Laruelle found that by growing the opaque form in
it was changed into the transparent type. Krogius wa
to confirm this result.

We have thus a bacillus termed variously the "ba
septique de la vessie," "bactérie pyogène," cocco-ba
urea, *B. lactis aerogenes, B. coli communis,* all possessing
same cultural characteristics and the same morphology,
motility, and causing cystitis in 71 per cent of the
examined.

Two points should suffice to prove that these cultures
not have been the *B. lactis aerogenes:*

1. All were actively motile—"movements of transla
2. They occurred in about 70 per cent of the cases
titis, which figures correspond closely to the percenta
cases of cystitis due to the colon bacillus as shown by
the later investigators.

The differences in morphology and the cultural differ
on gelatine are now known to be insufficient and too vari
to differentiate them as separate species.

From this period on, one finds the colon bacillus as
causative agent of cystitis in 50 to 71 per cent of all
of cystitis, while the *B. lactis aerogenes* has only rarely
found. A careful search of the available literature rev
only a few isolated reports.

In 1899 Warburg[12] reported a case of bacteriuria in a
54 years old, who was admitted to the hospital for a
bronchitis. On the fifth day after admission he had a
headache, and a rise in temperature to 39° C.
fever continued for three days, and on the second day
urine became cloudy. A catheterized specimen showed a
bacillus, often coccus-like, which was not motile. It di
stain by Gram's method. On gelatine the growth was
like; on potato whitish yellow; it coagulated milk in 12
in sugar bouillon it produced gas; it produced no ind

second month of preg-

ıcy. She suffered from a "myelitis lumbalis ascendens," ıpletely paralyzing the bladder and rectum, necessitating heterization three to four times each day.

Che urine was at first clear, acid, and free from albumen l sugar. On the fourth day after admission the urine bele cloudy, containing pus and red cells. Four days later ympanitic tumor reaching to the umbilicus was observed, l the urine finally became alkaline.

Che following organisms were isolated: a coccus which ıefied gelatine, a non-liquefying coccus, and a non-liquefy- bacillus. The last was identified as the *B. lactis aero- ·es,* and held by him as the cause of the pneumaturia.

Chis bacillus had rounded ends, but was so often like cus that doubts were entertained as to its purity until atine plates were made. The bacillus was not motile and not stain by Gram's method. No spores were observed. ɜ growth on potato was several millimeters thick, grayish ite, viscous, moist, and shiny, showing numerous gas bub- s. The bouillon was uniformly cloudy, forming a sedi- nt. Milk was coagulated in 24 hours. It fermented glu- ɜ and lactose. The gas consisted of 63 per cent CO_2, 27 cent H, and 8 per cent "undetermined rest." These portions of gas stamp it as a true *B. lactis aerogenes,* ac- ding to Burri and Düggeli.[15]

n 1901 Wildbolz[16] reported a case of pneumaturia in a n 52 years old who was suffering from a gonorrhœal cture which had to be dilated. Three weeks later he iced gas at the end of micturition. The urine was cloudy, l, and had a disagreeable odor. A non-motile organism isolated which did not stain by Gram's method. It gulated milk rapidly, actively fermented grape sugar, but not form indol.

n 1894 Schnitzler[17] reported a case of pneumaturia in a lipara 46 years old. In the fall of 1893 she noticed the sing of gas at the end of micturition, but did not suffer n any other symptoms. On December 11, 1893, a cystitis eloped and the patient was catheterized by a midwife, n which time on she had to be catheterized several times ay. A short, plump, non-motile bacillus was isolated ı the urine. This bacillus did not stain by Gram's hod. The growth on gelatine was profuse. It formed gas on sugar-free media. No note is made as to growth on or potato, the fermentation of glucose and milk sugar, formation of indol, or the presence of a capsule. His con- on was that his organism belonged to the colon group. ian and Hamm think that in the light of present-day vledge this bacillus really belonged to the lactis aerogenes p.

1896 Trumpp reported 29 cases of cystitis in children, of which was due to the *B. lactis aerogenes.*

y personal observations were made on two cases with the wing histories:

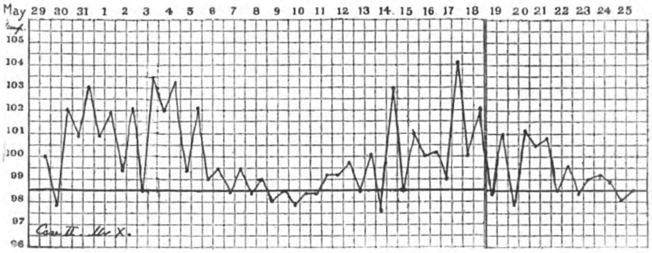
ɜE I.—Mrs. X, aged 28, during the second month of first preg- complained of frequent micturition which direction as to uids, and rest did not relieve. The symptoms became aggra-

in bed with a diet of milk and water, also suppositories of opium to relieve the straining. She had no pain in the region of the kidneys, and her temperature was never over 99° F. The urine was light yellow, acid, and contained a sediment consisting chiefly of leucocytes with an occasional red cell. Albumen and sugar were absent.

Bacteriological Findings.—Each of two catheterized specimens taken ten days apart showed the *B. lactis aerogenes* in pure culture. The condition persisted for four weeks with a marked tendency to recurrence whenever the urotropin was omitted. Later cultures were negative.

Case II.—On May 25, four days after the acute symptoms in his wife had shown themselves, Mr. X, husband of Case I, developed a urethritis, accompanied with a yellowish, watery, acrid discharge which contained a few pus cells but no gonococci. He suffered from frequent micturition and a marked tenesmus requiring opium suppositories. The urethral discharge disappeared after the first day of rest in bed, on a diet of milk and water. The tenesmus and frequency of micturition also abated. The temperature, which was at first practically normal, after four days reached 103° F., as shown in the accompanying chart.

There was marked prostration, headache, and some nausea. These constitutional symptoms so overshadowed the local process that a blood culture was made on May 31, and a Widal test on June 3. In both, the results were negative. A physical examination revealed nothing. The prostate was not enlarged or tender. The urine was acid and cloudy, the last portions being especially turbid. At times a decidedly bloody tinge was noted. On microscopic examination, the sediment consisted entirely of leucocytes and red cells.



On June 9, fourteen days after onset, the temperature reached normal and remained so for two days, after which the patient began to complain of pain in the right abdominal region, extending into the inguinal ring on the following day. Twenty-four hours later a marked epididymitis had developed. The temperature reached 104° F., and the fever continued until June 26. The case terminated in a complete recovery with no recurrence.

A bacteriological examination of the urine was made on the ninth and fourteenth day of the disease, and each time the *B. lactis aerogenes* was found in pure culture. The urine was obtained aseptically by means of a silk olive-tipped catheter, after previously irrigating the anterior urethra with a sterile boric acid solution.

Cultural Characteristics of Organisms Isolated.

In the hanging drop, Brownian motions were observed, but never independent movements such as to change the relative positions of the organisms. Cultures of different ages were tried, always with the same results.

Some difficulty was experienced in determining whether we were dealing with a coccus or a bacillus. Even in stained specimens there was doubt as to whether the culture was pure, until plates were made.

The organism was a small bacillus, with rounded ends; coccus forms were frequent. It did not stain by Gram's method. Capsules were readily demonstrated.

On agar plates, the colonies reached the size of one millimeter in diameter in 18 hours, and had a bluish opalescent appearance by transmitted light. Under the microscope, the colonies usually had a regular outline, while in some the borders showed slight undulations. They were translucent, with opaque and granular centers. The deep colonies were wedge-shaped and opaque.

The agar slants showed a bluish opalescent growth by transmitted light, one millimeter wide after 24 hours, and with raised edges.

On potato there was a heavy, yellowish white, viscous growth, several millimeters thick, rapidly covering the entire surface. The older cultures showed a deeper yellow color. No gas bubbles were observed.

Milk was coagulated in 24 hours with acid production.

Glucose agar stick cultures were much split up by the accumulated gas. In the fermentation tubes, saccharose solutions showed considerable gas production.

The morphology, capsule formation, absence of motility, rapid coagulation of milk, together with the gas production, leave no doubt as to the identity of the organism. The rapid coagulation of milk excludes the Friedlander bacillus.[18]

MODE OF ENTRANCE OF THE BACTERIA INTO THE BLADDER.

The bacteria may invade the urinary tract through the urethra, through the kidney, or from an adjacent abscess or other inflammatory process.

It is usually assumed that when there is no history of catheterization the infection must be an endogenous or descending one. There are two considerations which controvert this view:

1. The greater frequency of cystitis in women than in men, when there is no explanation of the mode of entrance of the bacteria into the bladder other than difference in sex.
2. The frequent existence of bacteriuria without infection of the ureters when no instruments have been introduced.

1. Relative frequency of cystitis in men and women in which there is no explanation of the mode of entrance of bacteria into the bladder other than difference in sex.

In general practice I have been impressed with the frequency with which one meets with cystitis in women, and the rarity of cystitis in men, if one excludes the cases due to gonorrhœa, tuberculosis, and diseases in which the bacteria are obtained by blood culture, such as typhoid, pneumonia, septicæmia, etc., and in those patients on whom instruments have been passed.

The gynecologist sees only women and the male genito-urinary specialist sees only men, so that neither has an opportunity to make a comparison. Nevertheless, the gynecologist must be impressed with the great number of cases of non-gonorrhœal cystitis in women who have never
catheterized; and the male genito-urinary specialist
struck with the fact of the rarity of a non-gonorrhœal
in the male who has never been catheterized, and who is
from any urethral or prostatic disease. A review of the
tories of the large series of cases reported bears out this
tention.

Of Rovsing's[19] 87 cases of bacteriuria and cystitis, 66
male, and 21 female. Of the 66 male patients, definite
tion of catheterization, fistula, or neighboring abscess
made in 51, or 88 per cent. Of the 15 remaining cases,
had phymosis; three had incontinence (one of which was
to tabes); five had retention due to stricture; and one
enlarged prostate. These therefore had a continuous
of urine through which the bacteria could readily have
entrance. One case had pneumonia and another
in both of which the organisms could probably have been
tained from the blood. This leaves only two cases, or
cent, without sufficient explanation as to the mode of
tion. Of these, one case was a boy 19 years of age with
teriuria, who had renal infection, while the other was a
of 78 years with bacteriuria who had cancer of the kidney.

Of the 21 women, only 7, or 33 per cent, had been
ized. In the remaining 14, or 66 per cent, the bacteria
ably gained entrance through the short urethral tract.
the latter, 3 were girls aged 6, 7, and 21 years
2 cases followed painful coitus; two suffered from slight
stipation; one had a tumor of the bladder; three were
76 years old who had never been catheterized; one
hematuria; one had a stone in the right kidney.

His cases of pyelitis without cystitis are even more
vincing. Of 21 cases, 16 were women and 5 men; of the
men, 2 had been catheterized or treated locally; 1
large prostate with complete retention; in only 2 cases
the 5, or 40 per cent, was there no explanation as to
cause of the infection.

Of the 16 cases in women, there were 15, or 93 per
without any explanation as to the mode of infection.

Of Melchior's[20] 35 cases, 20 were men and 15 women.

Of the 20 men, 16, or 80 per cent, had been
1 had tuberculosis; 1 was an old man with a large
who had incontinence; another had a large prostate
complete retention. This would leave only one case, or
cent, without explanation as to the mode of entrance
bacteria into the bladder.

Of the 15 women, 7, or 46 per cent, had been
1 had tuberculosis; another was suffering from a
cystitis. This would leave 6, or 40 per cent, without
tion as to the mode of entrance.

Escherich[21] reported 7 cases of cystitis in children
the ages of 6 months and 9 years, all due to the colon
Since all occurred in girls, and since several had a
vulvitis, he concluded that it was most probable the
entered through the short urethral tract.

Trumpp[22] reported 29 cases of cystitis in children
Escherich's clinic, of whom 21 were girls and 8 boys.

endogenous, 83 ectogenous or instrumental. Of the 35 endogenous 's, 15 were men and 20 women.

'f the 15 men in whom the infection is supposed to have ırred by the endogenous or descending route, one had orrhœa, stricture, and hypospadia; one had gonorrhœa ı a very narrow stricture; one had gonorrhœa and prostis; one had prostatitis and epididymitis; one had epididyis, large prostate, and residual urine; one was cystoıed, after which procedure a severe cystitis followed; one a cystotomy performed two years before for hematuria. of these should be considered as ectogenous. This would e 8 cases in which the histories are not complete enough letermine the route of infection, and as Alsberg[24] has , not one of which is convincing in regard to the endogenroute.

f the 20 women, only 2 were catheterized, leaving 18, or per cent, without explanation as to mode of entrance.

f his 83 cases classed under the heading of instrumental ctions, only 5 were women.

'hus in his total of 118 cases 93 were men, in 87 of whom origin of their cystitis was ectogenous, leaving only 6, .4 per cent, without explanation as to the mode of inion.

ı Brown's[25] series of 24 cases of chronic cystitis in women, ıad never been catheterized, leaving 41.6 per cent without anation as to route of infection.

o show how frequently women are infected, Albeck[26] res the following cases: Of 150 non-pregnant women, 13 cent had an infection of the urinary tract; in 392 pregt women, 17 per cent had an infection; in 392 puerperal ıen, 14 per cent had an infection.

ı Alsberg's series of 126 pregnant women, 12 per cent had nfection of the urinary tract; in 203 puerperal women, er cent had an infection; in 41 cases of abortion, 17 per had an infection.

ɔ summarize: In 192 men with cystitis or pyelitis, only ɔr 10 per cent, were without explanation as to the mode ıfection; while in 129 women, 81, or 62 per cent, were out explanation as to the route of infection.

there is a difference in the two sexes, it must be a local not a constitutional one, and we find a ready explanation ıe short and often relaxed urethral tract of the female.

BACTERIA IN THE NORMAL FEMALE URETHRA.

e bacteria usually causing cystitis are inhabitants of the le urethra, the percentage varying according to the charof the cases examined and the methods employed. The bacillus has been found by all observers in from 12 per to 66 per cent of the cases. Recently Alsberg has found ıacterium in 100 per cent of the cases. He selected six of pregnancy and examined the urethra each day for ɘ days. By taking *several loops of the secretion,* and ıg on Drigalski-Conradi media, he found the colon us in each case; if only one loop was taken, the results not constantly positive on the successive days. He confemale urethra.

The differences in results obtained by different observers are due to the methods used; some wiped the lower portions of the urethra with bichloride and did not wash away the excess, others simply wiped the meatus with sterile cotton. The findings were also proportional to the amount of material used. Some used the loop, others used the straight wire. In many the differences were due to the media and the exactitude of the bacteriological methods employed.

The staphylococcus albus and aureus were found by different observers in percentages varying from 14 per cent to 90 per cent.

The bacteria of the urethra enter the bladder in two ways: They are introduced with the catheter, or they may enter directly from the urethra.

Any one reviewing the histories of the cases thus far reported and the percentages of cystitis following catheterization, will be impressed with the fact that catheterization is a very serious procedure, especially when local conditions are present such as trauma following gynecological operations and labor, pressure due to tumors or pregnancy, prolapse, retention, or paralysis.

The invasion of the bladder by microorganisms in the urethra is probably much more frequent than is usually supposed. The recent work of Albeck and that of Alsberg, who found infections of the urinary tract in 12 per cent out of a total series of 500 cases, seem to confirm this view. If a careful bacteriological examination were made in every case with mild bladder symptoms, we should find an ever increasing number due to the invasion of bacteria. This direct invasion from the urethra is favored by retention and incontinence, which produce a continuous column of fluid.

Nor is the male urethra a bar to the exogenous invasion of bacteria. The gonococcus does not seem to have any difficulty in invading the urethra and bladder. If the cases of non-gonorrhœal urethritis were examined carefully and the etiology determined, we should probably find the cause to be the bacteria which usually cause cystitis. The staphylococcus, streptococcus, and a diplococcus were found by Eitner.[27] The staphylococcus, colon bacillus, and an unrecognized diplococcus were found by Hume[28] in 11 cases examined. Other organisms found were the pseudodiphtheria bacillus, influenza bacillus, and the Friedlander bacillus.

2. *The frequent existence of bacteriuria without infection of the ureters in cases which have never been catheterized.*

Those who adhere to the endogenous route of infection refer to the fact that pyelitis, which is usually due to the colon bacillus, often occurs without any demonstrable lesion in the bladder.

Albeck has shown that in 150 non-pregnant women 13.3 per cent had bacteriuria, in 70 per cent of whom the bacteriuria was due to the colon bacillus. To determine whether the ureters were also infected he selected 13 cases and catheterized both ureters; in 8 cases the urine was clear and sterile from both ureters; in 3 no organisms were found on coverslips, and only a few colonies were found on the plates, which he concluded were accidental; in 2 only were the bacteria in great numbers. He justly concludes that in a great majority of the cases the infection originates in the bladder.

We know that the bladder is very resistant to infection, and that the mere introduction of the colon bacillus will not produce a cystitis. If, however, the urethra or ureter is tied, a cystitis or pyelitis develops. All that is necessary to convert a bacteriuria into a pyuria is a retention. Such a retention is often produced during the second half of pregnancy, due to pressure on the ureters. Stone, trauma, or any of the accessory causes named above will produce the same result. If the retention or trauma affects the kidney, and not the bladder, a pyelitis develops without a cystitis.

The pathological and bacteriological studies of Schmidt and Aschoff (loc. cit.) of 16 cases of pyelo-nephritis confirm this view. They found that a microscopic examination usually gave the clue as to the route of infection. Where this failed, the microscopic examination supplied the information. The process always followed the tubules, and was ascending.

The preceding review thus shows that an ascending infection is of very common occurrence in women, and is also possible in men, when no instruments have been introduced into the bladder.

In the two cases reported in this paper the infection was an ascending one. In Case I the infection was limited to the bladder, since there was no pain in the region of the kidney and since there was no fever. The congestion and pressure caused by the pregnancy supplied the accessory factors enabling the organisms to invade the bladder.

In Case II (the husband) the infection certainly was an ascending one, since the infection started with a urethritis and since there was no fever until the infection reached the bladder. His symptoms started four days after the *acute* symptoms in his wife had developed, and were more severe, due possibly to the increased virulence of the organism which had passed through an intermediary host. The epididymitis must have been caused by the same organism, and extended by continuity along the seminal ducts as shown by the sequence of the location of the pain, and the gradual rise of the temperature. This case is particularly interesting in that it shows definitely an ascending infection of the bladder in the male by an organism other than the gonococcus. The general impression seems to be that unless instruments have been introduced, the infection of the bladder in the male must be by the blood route.

As a summary of this review, the following conclusions may be drawn:

1. The *B. lactis aerogenes* is a rare cause of cystitis.

2. The great majority of infections are due indirectly to the introduction of instruments.

3. Infections of the bladder, in cases where no instruments have been introduced, are very frequent in women and rare in men.

4. In infections of the bladder in women, without a history of the introduction of instruments, the route of infection is usually an ascending one and due to the direct invasion of bacteria from the urethra.

5. Such direct invasion of the bladder also occurs male, and probably much more frequently than is supposed.

6. The introduction of a catheter or instruments bladder is a very serious procedure, since it may prod pyuria if the local conditions are favorable, or a bacter which later may be converted into a pyuria when th conditions become favorable.

BIBLIOGRAPHY.

1. Morelle, Aimé: Étude bactériologique sur les cystites Cellule, 1891, VII, 241.

2. Denys: Étude sur les infections urinaires. Bull. Acad de méd. de Belg., 1892, 4 s., VI, 112.

3. Achard et Renault: Sur les rapports du bacterium commune avec le bactérium pyogène des infections urin Compt. rend. Soc. de biol., 1891, 9. s., iii, 830.

4. Reblaud, Th.: Ibid., 1891, 111.

5. Krogius: Note sur le rôle du bacterium coli commune l'infection urinaire. Arch. de méd. expér. et d' anat. Paris, 1892, IV, 66.

6. Flügge, C.: Microorganismen, 1896, 11, 341.

7. Clado: Etude sur une bactérie septique de la vessie. Paris, 1887.

8. Albarran et Halle: Note sur une bactérie pyogène son rôle dans l'infection urinaire. Bull. Acad. de méd.,

9. Doyen, cited by Cornil and Babes: Les Bactéries,

10. Rovsing: Die Blasenentzundüngen, Berlin, 1890.

11. Schmidt and Aschoff: Die Pyelonephritis, Jena,

12. Charrin: Sur la bactérie commune des infections Compt. rend. Soc. de biol., 1891, 9. s., iii, 851.

13. Warburg, F.: Uber Bacteriurie. München. med. 1899, XLVI, 955.

14. Heyse: Ueber Pneumaturie, hervorgerufen durch rium lactis aerogenes, und ueber pathologische Gasbildung thierischen Organismus. Ztschr. f. klin. Med., 1894, XXIV,

15. Burri and Düggeli: Beiträge zur Systematik der aerogenes Gruppe nebst Beschreibung einer neuen Methode Untersuchung der Gärungsgase. Centralbl. f. Bakteriol. u. sitenk., 1909, Erste Abt., Originale, XLIX, 145.

16. Wildbolz: Beitrag zur Kenntniss der Pneumaturia. f. schweiz. Aerzte, 1901, XXI, 683.

17. Schnitzler: Ein Beitrag zur Kenntniss der Internat. klin. Rundschau, 1894, VIII, 265, 306.

18. Wilde, M.: Ueber den bacillus pneumonie und verwandte Bacterien. Centralbl. f. Bakteriol. u. 1896, Erste Abt., XX, 681.

19. Rovsing, T.: Klinische und experimentelle über die infektiösen Krankheiten der Harnorgane, Berlin,

20. Melchior, Max: Cystite et infection urinaire, Paris,

21. Escherich: Das Bacterium coli als Cystitiserreger. tralbl. f. Bacteriol. u. Parasitenk., 1894, XV, 901.

22. Trumpp: Uber Colicystitis im Kindesalter. München. Wchnschr., 1896, XLIII, 1008.

23. Suter, F.: Zur Ätiologie der infectiösen Erkrankungen Harnorgane. Ztschr. f. Urol., 1907, I, 97, 207, 327.

24. Alsberg, P.: Die Infection der weiblichen Harnwege. f. Gynäk., 1910, XC, 255.

25. Brown, T. R.: Cystitis, pyelitis, and pyelonephritis women. Johns Hopkins Hosp. Rep., 1902, X, 11.

26. Albeck, V.: Bakteriurie und Pyurie bei Schwangeren Gebärenden. Ztschr. f. Geburtsh. u. Gynäk., 1907, LX, 466.

27. Eitner, E.: Zur Kenntniss der nicht-gonorrhoeischen thritis. Wien. med. Wchnschr., 1909, LIX, 2411, 2474.

28. Hume, J.: An inquiry into the causation of non- urethritis. J. Am. M. Ass., 1910, LIV, 1675.

THE OVARY.*

By Ernest K. Cullen, M. B.,

Resident Gynecologist, The Johns Hopkins Hospital.

ıe association of malignant epithelial and connective e tumors in the same organ is well known. Carcinoma sarcoma have frequently been found associated in the ıs. • Each process has, however, been well defined and ɔly differentiated from the other. The combination of : two processes in a single tumor is seldom observed. h interest has been manifested in this combination since vork of Ehrlich[1] and Apolant on the transplantation of nomatous tumors in rats. From a purely carcinomatous ɔr, they were, by repeated transplantation, able to procure xed tumor of carcinoma and sarcoma, and finally a tumor ing pure sarcoma. Their findings have been corrobor- in Bashford's[2] laboratory. To use Bashford's words: ring transplantation of a rather slow growing adeno- noma with a somewhat fibrous stroma, a sarcomatous stitial tissue has appeared in several separate strains. has outgrown the carcinomatous elements in subsequent rations and given rise to a pure spindle-cell sarcoma." ted cases showing these combined processes have been rted. In 1904 Nebesky[3] reported a case of adenocarci- ı of the body of the uterus, showing a stroma of mixed- sarcoma. Taylor,[4] in 1909, reported a case of adeno- noma of the thyroid gland with a stroma of mixed-cell ɔma, the latter process being the more vigorous.

careful search of the literature for such a tumor occur- in the ovary has been unsuccessful. It was therefore ıed of sufficient pathological importance and interest to t in detail the following case:

ss S., white, aged 50. Admitted to the Church Home and nary in the service of Dr. T. S. Cullen, November 11, 1909. everal months she has had a great deal of pelvic pain and he past two months has had considerable dysuria, neces- ng frequent catheterization.

pelvic examination, the cervix was found to be forward, terus back, and there was considerable edema of the vaginal together with some slight induration. The pelvis and abdomen were filled by a rather tender hard tumor mass. was strong suspicion of malignancy, so an immediate ex- ory operation was indicated.

ration, November 13, 1909. When the patient was ex- d under ether it was deemed advisable to do a pelvic ure. A considerable quantity of free fluid and a great deal od were obtained, but there was no diminution in size of ımor mass. The abdomen was at once opened and the mass felt on ether examination found to be a malignant growth of the left ovary. The bladder was drawn high up over the tumor and adherent to the posterior surface; thus accounting for the dysuria and the necessity for catheterization. The tumor, together with the uterus and appendages from the opposite side, was removed as rapidly as possible. During removal it was found that the right ureter was densely adherent to the tumor and there was involvement of the peritoneum in the right side of the pelvis. The right ureter was dissected free by splitting the anterior part of the broad ligament, which enabled the operator to expose the ureter with considerable ease. Fully one-third of the pelvic peritoneum was removed with the tumor, and as far as could be seen macroscopically, no malignant tissue was left. An iodoform drain was placed down through the pelvis.

The patient made an uneventful convalescence.

Gyn. Path. No. 14414. *Pathological Report.*—The specimen consists of a uterus which has been removed supravaginally, together with a mutilated mass of tissue representing the appendages from the right side and a solid tumor of the ovary from the left side. Attached to the tumor is the left tube.

The uterus, apart from adhesions laterally, shows nothing abnormal. The right tube and ovary are bound in adhesions and the ovary is cystic. Fig. 1.)

The ovarian tumor in its present flattened condition measures 15 x 14 x 7 cm. It is generally smooth on the surface but in a few places old tags of adhesions are present. It has been attached by a pedicle about 3 cm. in diameter. Coursing over the tumor and attached to it by thin mesosalpinx is a tube, which has been converted into a hydrosalpinx. The surface of the ovarian tumor is somewhat irregular and nodular. It is greyish-yellow in color and numerous congested vessels are visible upon the surface. These vessels are most prominent in the valleys between the slightly nodular elevations. On section the tumor is found to contain a central shallow cavity measuring 5 x 9 cm., and at one point near the periphery it reaches a depth of 2 cm. (Fig. 2.) The floor of this cavity is smooth and is lined by a thin yellowish-white fibrillated membrane. It resembles very much a markedly enlarged kidney pelvis. Surrounding the cavity and occupying the space between it and the cortex are irregular lobulated areas which are greyish-yellow in color and in places present a finely granular honey-combed appearance. (Fig. 2, *a.*) In some places distinct hemorrhagic areas are visible and in others there is simply a brownish coloration of the tissue. At other points about the periphery are irregular firm whitish areas varying from 8 mm. to 2 cm. in diameter. (Fig. 2, *c*, *g*, *e.*) In some places these areas show evidence of breaking down with slight cystic formation. The picture presented is a distinctly malignant one. In some places the tissue appears carcinomatous, in others it resembles sarcoma.

Gyn. Path. No. 14414. *Microscopic Examination.*—Sections were taken from eight different portions of the tumor, representing every gross type of pathological process present. The tumor is found to consist of a well-defined adenocarcinomatous process and an equally well-defined sarcomatous one. In certain parts of the tumor these two processes are side by side. In others there is pure sarcoma with absence of any carcinoma. In still other parts are found areas where there is well-defined carcinoma and a rather cellular and suspicious looking stroma; the stroma, however, not showing the typical picture of sarcoma seen elsewhere. In those sections showing the combined processes, the

---

report of the original tumor was made before the Johns ns Hospital Medical Society April 18, 1910.

rlich, P., and Apolant, H.: Berl. klin. Wchnschr., 1905, 871.

shford and Haaland: Imperial Cancer Research Fund. l scientific report.) London, 1908, 248.

besky: Arch. f. Gynäk., 1904, LXXIII, 653.

ylor: J. Path. and Bacteriol., 1908, XII, 440.

carcinomatous one is marked by large islands of glands (Fig. 3), the glands in most instances being irregular in size and shape and presenting a distinctly atypical appearance (Fig. 4). The individual cells vary in size, shape, and staining qualities, and many nuclear figures are visible. Immediately adjacent to these islands of glands, the stroma shows a distinctly malignant appearance. The predominating cells are spindle-shaped and round, but there are many large irregular, deeply staining cells scattered throughout (Figs. 3 and 4, *d*). Some parts of the tumor show a greater number of these large cells than do others. The individual stroma cells vary in size and shape. The nuclei are as a rule large, stain rather deeply, and assume an oval or round contour. The protoplasm of the cells takes a fairly uniform stain. The large (atypical giant) cells assume different sizes and shapes. (Figs. 3 and 4, *d*.) The nuclei are irregular in outline, multiple, very deeply stained, and are surrounded by a considerable quantity of protoplasm. A number of nuclear figures are visible. The carcinomatous and sarcomatous processes are entirely distinct and independent and this point is especially well emphasized by the fact that the glands of the carcinoma have retracted from the stroma and there is a distinct area of separation between the two. The cells which line the narrow spaces that separate the carcinomatous from the sarcomatous processes are in the main uniform in appearance and seem to form a distinct membrane. In some portions of the tumor there is marked degeneration. Here the tissue has undergone extensive hyaline change and merely shadows of cells are present. Sections taken through the periphery show a well-defined capsule, which has undergone partial hyaline degeneration, and considerable infiltration with round cells. At no point was there evidence of penetration by either malignant process. The vascularity of the tumor, while not especially prominent, is in greater evidence where the sarcomatous process is most active.

The right ovary on microscopic examination shows no evidence of malignancy. Both tubes show some chronic inflammation, but there is no involvement by the malignant process. Sections from the body of the uterus show an early diffuse adenomyoma. The cervix is quite normal.

From the tumor it is impossible to determine whether one process preceded the other or whether the development was simultaneous. It is significant, however, that in those areas where the carcinomatous elements show the greatest disintegration the sarcomatous process presents a wilder and a more rapidly growing appearance. Degeneration seems to play some rôle in the early development of sarcoma in certain instances. This point has been emphasized by Kelly and Cullen[5] in their examination of myomata which have undergone sarcomatous transformation. In many instances the sarcomatous tissue was adjacent to hyaline degeneration on the one side, and fairly typical looking myomatous tissue on the other. Bashford (*loc. cit.*) states: "In all the latter stages of sarcoma development we find the first changes beginning in the center of the carcinomatous tumor where sclerotic changes are present."

RECURRENCE OF TUMOR IN PELVIS.

Within a few weeks after leaving the hospital, there were signs of a recurrence of the tumor in the pelvis and the patient died on October 27, 1910, eleven months after the operation.

Autopsy Report.—(The body had been embalmed with a weak formalin solution about ten hours before the post mortem examination.) The body is markedly emaciated and the shows a diffuse yellowish tinge. There is some abdominal tension, due partially to fluid, but no edema of the extre is present. On opening the abdominal cavity, there is fo be some distension of the bowel and about one liter of fluid, with a distinctly formalin odor. The viscera have partially hardened. Occupying the pelvis is a large semi mass which is intimately adherent to the sigmoid, re bladder and pelvic wall. Scattered everywhere over the of the large and small bowel are numerous firm whitish varying in diameter from 1 mm. to large confluent patches proximately 7 cm. in diameter. Sections through the affe portion of the bowel show the process to be limited to the coat. The omentum is markedly thickened and is studde numerous large and small firm white nodules, similar to on the bowel surface. The liver, spleen and kidneys are sli enlarged, but show no evidence of metastases. Both lung edematous and a few scattered areas of broncho-pneumonia present. Careful examination showed no evidence of meta outside of the peritoneal cavity, no enlarged retroperito glands were found.

Anatomical Diagnosis.—Pelvic tumor, general peritonea astases, broncho-pneumonia.

Gyn. Path. No. 15613. *Pathological Report.*—The tumor measures approximately 15 x 12 x 12 cm. It is cystic in acter and is covered by many old adhesions. On sectio found numerous cystic spaces, the largest of which is app mately 8 cm. in diameter. These contain some light colored fluid and are lined by a shaggy tissue which is rea peeled off. The walls, which vary in thickness from 0.5 to consist of a moderately soft homogeneous tissue, pinkish in color, closely simulating sarcoma.

Histological Examination.—As in the original tumor the processes are combined, but the sarcomatous elements pred nate. Scattered throughout a bed of sarcomatous tissue groups of glands presenting the typical picture of adeno noma (Fig. 5). The sarcoma belongs to the mixed-cell type spindle cells predominating. Numerous large, so-called cells, are present. These are well seen in Fig. 6. In some tions the picture was one of pure sarcoma, no glands visible (Fig. 6). The metastases on the bowel wall and omentum show a picture of adenocarcinoma (Fig. 7). stroma shows no evidence whatever of sarcoma.

Study of the original tumor shows a combination two malignant processes, the carcinomatous elements dominating. In the recurrent tumor, however, the pr is mainly sarcomatous in character.

It is interesting to note that metastases were purely cinomatous. They were limited to the peritoneal surfa the bowel and the omentum, simulating in great measur picture observed in malignant papillocystomata of the with general peritoneal implantations.

I am indebted to my brother, Dr. Thomas S. Cullen the privilege of reporting this case and to Dr. J. S. Blo and Mr. Schapiro for the protomicrographs.

The patient was referred to Dr. Cullen by Dr. Clara E of Hagerstown, Md.

DESCRIPTION OF FIGURES.

Fig. 1.—Gyn. Path. No. 14414 (natural size). This pictu resents the appearance of the ovarian tumor which has hardened in 10 per cent formalin.

Fig. 2.—Gyn. Path. No. 14414 (natural size). On sec the tumor various stages of cystic and hyaline degenera visible. *b* represents a large central cavity lined by a s

---

[5] Cullen. Myomata of the Uterus. W. B. Saunders Co.,

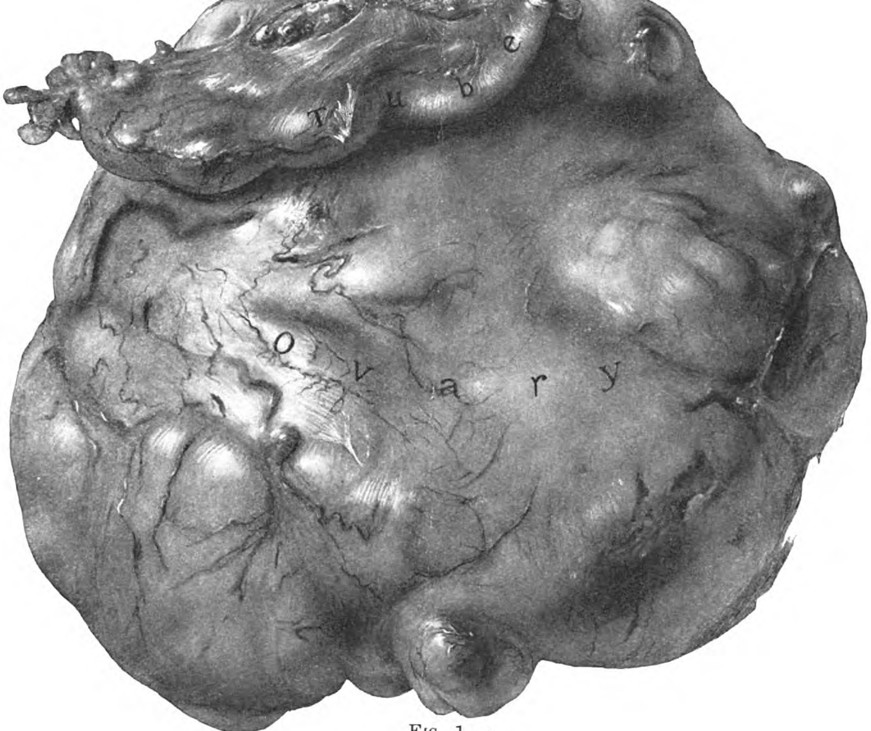


Fig. 1.

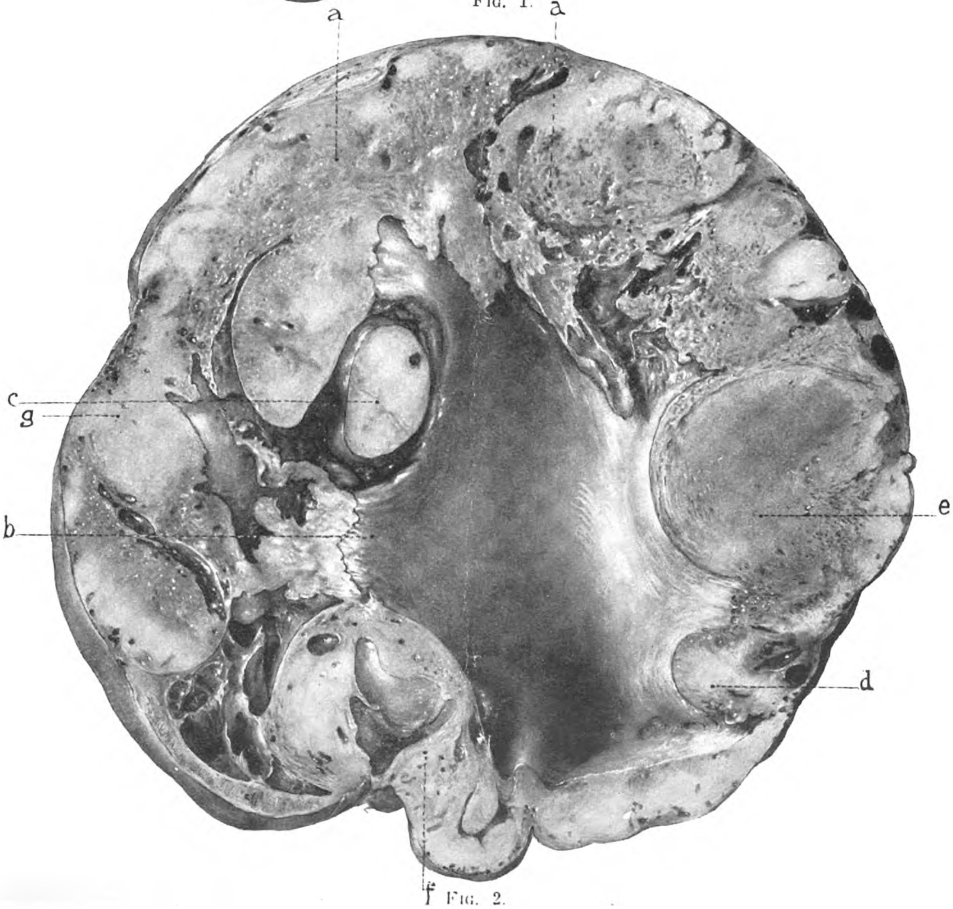


Fig. 2.

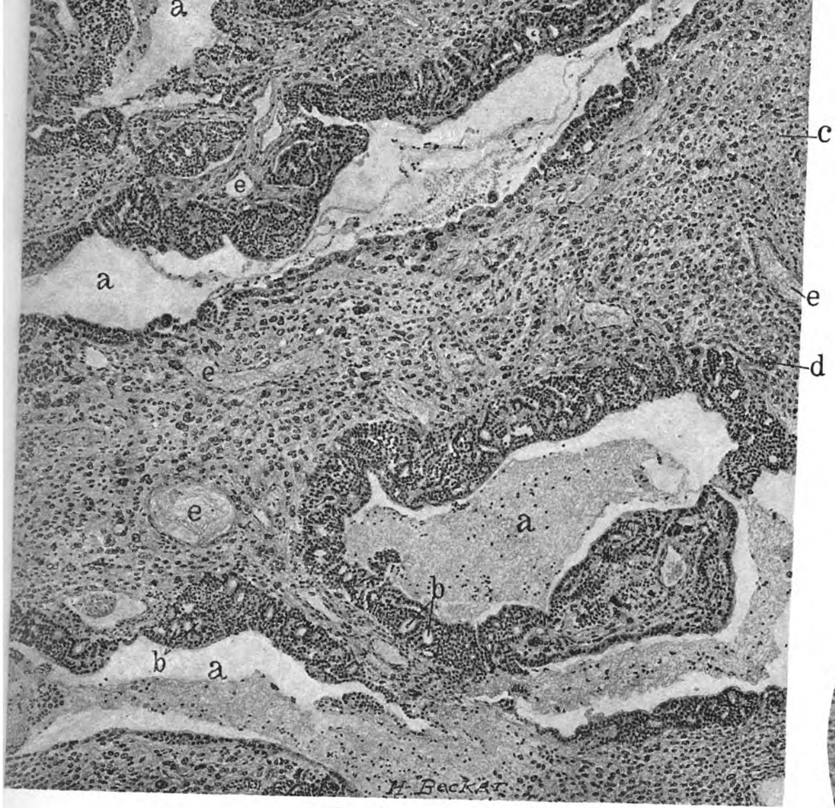


Fig. 3.

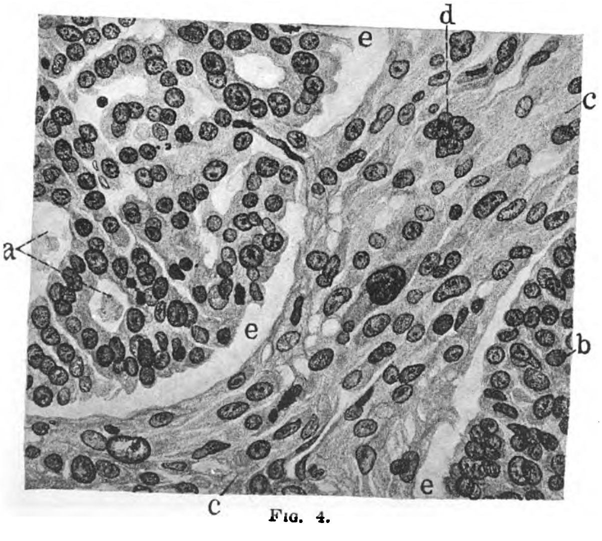


Fig. 4.

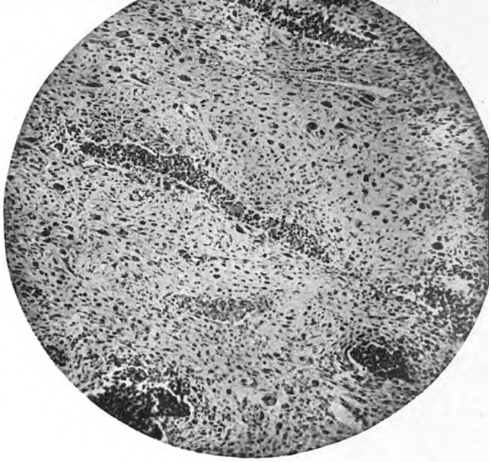


Fig. 5.

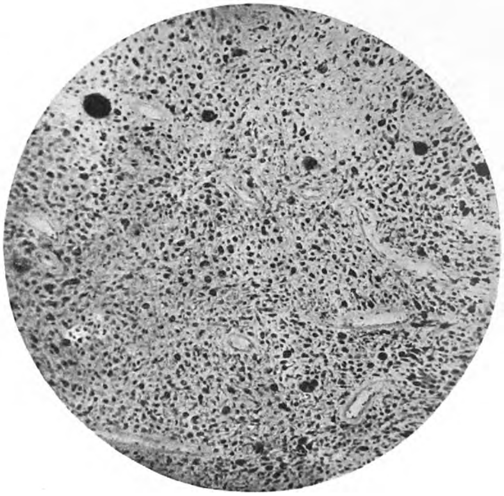


Fig. 6.

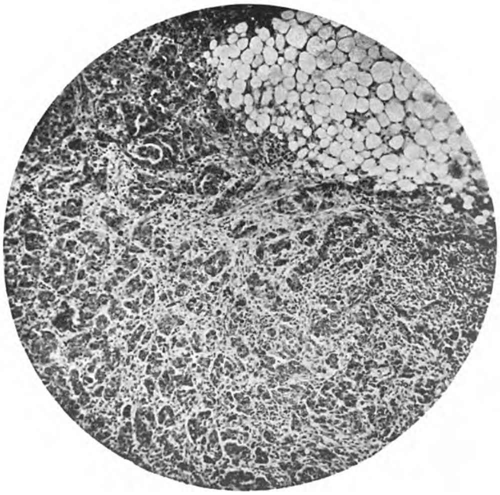


Fig. 7.

y the tissue is fairly homogeneous and looks like na. *f* is a small blood vessel.

3.—Gyn. Path. No. 14414 (80 diameters). The two proc- are well represented here. At *a* are seen the large gland a partially filled with coagulated fluid. The glands present pical picture of adenocarcinoma. The stroma *c* shows a dly active and malignant picture. The majority of the ire spindle shaped, but numerous large irregular cells, *d*, ound scattered throughout. The stroma is rich in blood s *e*.

4.—Gyn. Path. No. 14414 (380 diameters). This illustra- hows a magnification of the picture seen at Fig. 3, *b*. Note rge atypical cells lining the glands *a*. At *b* the glands are less well defined. The stroma *c* consists of cells irregular

and sarcomatous processes, showing a tendency on the part of the carcinoma to retract from the sarcoma.

Fig. 5.—Gyn. Path. No. 15613. The section here pictured is taken from the recurrent tumor. The combined malignant processes are well marked. The sarcoma predominates and appears much more active than the process in the original tumor (Fig. 3).

Fig. 6.—Gyn. Path. No. 15613. This section shows a portion of the recurrent tumor which is purely sarcomatous in character. Note the number of large atypical cells.

Fig. 7.—Gyn. Path. No. 15613. This shows a section through the thickened and nodular omentum. The adenocarcinoma is well marked. The stroma shows no evidence of sarcoma.

THE BLOOD-PICTURE IN HODGKIN'S DISEASE.

By C. H. Bunting, M. D.

(From the Pathological Laboratory of the University of Wisconsin.)

ɜ blood-picture of Hodgkin's disease, as manifested in ırious published cases, has been critically considered by n[1] in a recent article, and his findings are summarized lows:

The most frequent blood-picture found in the course ıdgkin's disease is a polymorphonuclear neutrophile leu- ɔsis of moderate grade.

The blood-picture may be unmodified (about one-fifth cases).

In about one-fifth of the reported cases there is a more s well marked leukopenia, either present throughout the course, or transitory, and if the latter occurring more ntly in late stages.

Qualitatively, the blood shows a relative neutrophile ytosis—that is, an increase in percentage up to 99 per nd more; with a corresponding decrease in lymphocyte ıtage to 3 per cent and, in two cases, to practically 0 nt; most frequently at the same time with an absolute ytosis, at times with a leukopenia and, rarely, with a l count.

In about one-fourth of the cases there was an eosino- usually slight or moderate, seldom of marked degree.

Very seldom one may find a mastzell increase.

Scattered myelocytes were noted—very rarely enough mate.

In one case an enormous increase in blood-platelets ıted.

At times, though usually transitory, a slight, rarely ed, lymphocytosis may be noted.

In the course of the disease there develops a second- æmia, at first moderate, but later pronounced.

an's general conclusions from his study of these cases while there may be characteristic features of the blood-picture in Hodgkin's disease, they are not constant enough to be of diagnostic value, and that in further study an attempt should be made to correlate the blood picture and that found in the glands. During the past three years the author has been making such a study in conjunction with Dr. J. L. Yates, of Milwaukee, and, while his findings are in general in agreement with those of Fabian, yet, on the other hand, they are sufficiently at variance to seem to warrant publication. There are two features of this study which may be emphasized, and which add to its value. In most of the cases at least one blood count has been made just previous to the removal of a gland for section, and further, all the smears have been examined by one person, the author, who has used the same staining and counting technique throughout.

In a previous paper[2] I have emphasized one of the most marked characteristics of the blood smears of Hodgkin's disease, that is, the presence of a large number of blood-platelets, inclusive of unusually large platelet forms, practically megalokaryocyte pseudopodia. This has been observed in all the eleven cases forming the basis of this report, both in early and in late cases, and over considerable periods of time in cases on which blood counts have been made at intervals.

From this constant finding and from pathological findings in autopsy material from cases of Hodgkin's disease, it was suggested in the previous report that the toxin of the disease acted as strongly upon the platelet-forming elements as upon the lymphocytes. An eventual necrosis of megalokaryocytes in the bone-marrow was found. One might have predicted from this finding that in late cases an exhaustion of platelets might take place, resulting in a low platelet count in the circulation. Such a case had not occurred in the author's series at the time of publication of his first report, but since then Case V of the series has shown such a change. After

---

ıer klin. Wchnschr., 1910, XXIII, 1515; Centralbl. f. allg. 911, XXII, 145.

[2] Johns Hopkins Hosp. Bull., 1911, 114.

having shown a high platelet content of his blood in counts at intervals from November 9, 1909, to September, 1910, the boy returned to the Columbia Hospital, Milwaukee, in April, 1911 with serious hæmorrhages from the mucous membranes, with a secondary anæmia, a leukopenia—3500 to 4000—and fewer platelets than leukocytes, as shown by repeated examinations made during April and May. However, while exceptional or terminal cases may show this platelet exhaustion, the excessive number would appear to be constant in the course of the disease.

Coincident with this platelet study, careful study of the leukocyte picture in the disease has been made and has led to the conclusion that in the combined platelet and leukocyte picture one has features that are very characteristic and, in fact, almost pathognomonic of Hodgkin's disease. While from my experience I believe that the diagnosis may be made from examination of the blood smear, I would not recommend the method to the exclusion of the histological examination of an excised gland. The latter method is too simple to neglect, but, where glands are inaccessible, or where permission for removal is not obtained, the examination of blood smears is very helpful, and is especially convincing if backed by a negative von Pirquet reaction.

In this study, blood smears from eleven cases of Hodgkin's disease have been carefully examined and differential counts made. In a few cases several counts have been made at intervals of some months, giving confirmatory evidence of the value of the picture. The cases have varied in their stage of development from early cases to those a few months from the fatal termination, so that it has been possible to note the changes which take place in the blood-picture with the development of the disease.

The blood smears have been stained with Wright's stain for the purposes of the counts, although Ehrlich's triple stain has been used for the determination of certain features. Five hundred cells have been the routine and the smallest number counted, but in some cases this has been exceeded. The leukocytes have been grouped into seven classes, except in a few of the early counts where but six were made. These groups are: (1) Polymorphonuclear neutrophile (N.); (2) Eosinophile (E.); (3) Basophile (mastzell) (B.); (4) Small lymphocyte (S. L.); (5) Large lymphocyte (L. L.); (6) Large mononuclear (L. M.); (7) Transitional (Tr.).

While the first three groups need no explanation, a word may be due as to the divisions of the so-called mononuclear or non-granular groups. Study of blood smears from normal individuals, stained with the Romanowsky stains, shows four distinct types of mononuclear cells. However, in studying large numbers of these cells, one finds that the distinctions in size and staining reaction are not always sharply made; that is, the groups overlap somewhat, so that the separation becomes more or less arbitrary. This is especially the case in regard to the small and large lymphocyte groups, and in regard to the large lymphocyte and the large mononuclear. In the earlier counts the last two groups were included under a single head. Although this grouping may be artificial and arbitrary, the same standards were employed throug forming a judgment, and the separation may be value.

The groups are characterized as follows:

(1) *Small Lymphocyte.*—A cell with deeply nucleus, which scarcely exceeds a red-blood cell in and with a scant rim of basophilic protoplasm.

(2) *Large Lymphocyte.*—A cell usually almost th a neutrophile leukocyte with nucleus larger than th preceding class, and with protoplasm more abund basophilic as a rule, and containing numerous coarse, times almost rod-like metachromatic granules.

(3) *Large Mononuclear.*—A cell larger than a neut leukocyte, with large round or oval nucleus and con protoplasm, staining a fairly deep blue and contain times a few fine metachromatic granules.

(4) *Transitionals.*—The largest cells of the group nuclei of various shapes, from simple indented lobed, mulberry-shaped, or even ring-shaped nuclei; a abundant clear, light-blue protoplasm thickly dotted wi metachromatic granules which do not stain with Eh triple stain.

As the transitional leukocyte forms a prominent fea the differential picture in Hodgkin's disease, a furthe in regard to it seems necessary. It is quite evident named, for it bears no relation to the polymorph neutrophile. To one "brought up" medically on the E stain, this cell as revealed by Wright's stain comes as prise. With the Ehrlich stain, the nucleus is but stained and its structure is poorly brought out, wh protoplasm usually appears as an unstained halo, or wi a slight tint and with but an occasional granule. Wright's stain, however, the nucleus stains sharply, massive and of a protean variety of shapes—knobbed, twisted, folded, ring-shaped. So complex are the nu least in Hodgkin's smears, that one is at first incli believe he is dealing with a foreign cell. Yet the present in normal smears to the extent of from 6 to cent of the leukocyte count, and the nuclei appear al not fully as complex as in Hodgkin's smears. The plasm of the cell stains a clear blue and is crowded wi azure granules finer than those of the neutrophile leu They are finer also than the platelet granules, but ha same tint. As noted above, they are unstained by the E stain. I do not desire to discuss the relation of the tional cell to other cells or to enter into the question origin, further than to say that cells morphologica tinctorially similar may be found in smears from lymph glands.

Preliminary to the detailing of the blood counts in Hodgkin's cases examined, it should be said that al smears, with the exception of the late ones in Case V. very abundant platelets and in every case also large forms and pseudopodia were present. The leukocyte nations and the brief clinical points necessary, follow

October 30, 1908, showed early ;kin's changes. Gradual improvement under treatment. l counts:

Date.	R. b. c.	W.b.c.	N.	E.	B.	S. L.	L L.		L.M.	Tr.
20, '08......	5,304,000	7.500	51.2	8.2	1.6	25.4		10.		8.6
4, '09.. .	4,968.000	4.800	55.2	2.4	0.8	23.6		6.6		11.4
11, '09......	5,600,000	7,000	65.8	2.8	0.0	16.8	7.6		1.2	5.8
16, '10......	5 800,000	7,000	59.8	4.0	1.4	15.4	8.8		1.8	8.8
9, '11.......	....	8,500	65.0	2.6	1.2	21.2	8.		0.6	6.4

sE II (Dr. Yates).—Male, white, 10. Large mass of dis- glands in left cervical region of at least one year's dura- previous to removal, November 10, 1908. Glands show narked Hodgkin's picture. Von Pirquet reaction negative ›er 8, 1910. Gradual improvement under treatment. Blood :s:

Date.	R. b. c.	W.b.c.	N.	E.	B.	S. L.	L. L.		L.M.	Tr.
1, '09.......	4,712.000	9,500	56.2	8.6	0.4	16.4		7.4		11.0
22, '10.......	5,250,000	9,600	63.6	8.6	0.0	12.0	12.0		2.0	6.8
12, '10.	....	....	53.4	5.2	1.0	13.	16.		1.6	9.8
8, '10.......	4 960,000	9,800	53.2	5.2	0.4	27.8	4.		1.4	8.

sE III.—April 1, 1909. Male, white, 30. Seen 2 weeks after d operation for glands of neck. First operation 6 months ous at Rochester. Diagnosis, Hodgkin's disease. Blood .s:

ate.	R. b. c.	W.b.c.	N.	E.	B.	S. L.	L. L.		L. M.	Tr.
'09..........	4,560,000	10.000	79.4	0.2	0.4	5.8		3.4		10.8

sE IV (Dr. Tupper, Eau Claire, Wis.).—February 5, 1910. .le, white, 40. Onset, — months previous in right inguinal s. Subsequent involvement of left inguinal, left axillary, ınd right cervical glands. Test gland shows well-marked ; Hodgkin's picture. Death in October, 1910. Blood count:

Date.	N.	E.	B.	S. L.	L. L.	L. M.	Tr.
5, '10.............	36.	0.6	0.2	39.2	10.6	2.8	10.6

E V (Dr. Yates).—November 9, 1909. Male, white, 8 years. gement of cervical glands began 5 months previous to Left inguinal glands also enlarged. Test gland, November 909, shows hyperplastic stage of lesion. January, 1910, :al glands removed. October, 1910, von Pirquet test nega- April, 1911, mucous membrane hæmorrhages, anæmia. counts:

Date.	R. b. c.	W.b.c.	N.	E.	B.	S. L.	L. L.		L. M.	Tr.
9, '09.......	....	9,900	59.4	4.6	0.4	21.8		3.6		10.2
0, '09.......	....	......	50.8	5.8	0.6	26.8		7.2		8.8
6, '10.......	5,000,000	5,000	55.2	1.4	0.4	22.4	9.2		2.0	9.4
7, '10.......	5,160,000	8,700	59.4	1.	1.2	16.4	6.6		5.	10.4
1, '11.......	3,456,000	4,800	63.2	1.8	1.	10.2	4.6		1.4	17.8
nsfused.										
4, '11.......	3,176,000	3,800	54.	6.8	0.2	17.8	4.8		1.8	14.6
2, '22.......	2,624 000	8,300	67.6	1.4	1.4	6.8	9.6		0.6	12.6
nsfused.										
5. '11.......	2,760,000	4.500	51.6	2.6	2.	18.8	7.6		0.6	13.8
9, '11.......	3,200,000	4,000	50.8	4.	1.6	25.8	6.4		0.6	10.8
nsfused.										
0, '11.......	....	..	60.	9.8	0.6	8.2	6.8		0.4	14.2
3 '11.	3,400.000	3,500	56.2	4.8	0.8	17.6	6.4		0.4	13.8
2, '11.......	3,712,000	3,400	55.8	3.2	0.0	19.8	3.6		1.2	16.4
9, '11.... ..	3,680,000	3,600	56.4	3.4	1.6	18.	8.1		0.6	11.8

E VI (Dr. Sullivan, Madison, Wis.).—March 1, 1910. Male, 16. Left cervical glands much enlarged. Marked indura- f neck. Enlargement noted for only 1 month, but the t of sclerosis in test gland suggests greater duration. 10, wound resulting from removal of gland for diagnosis nhealed. May 13, wound healed but induration of neck d. Blood counts:

Date.	W.b.c.	N.	E.	B.	S. L.	L. L.	L. M.	Tr.
10, '10....................	18,000	81.6	0.6	0.4	4.2	3.	1.6	8.6
13, '10....................	27,000	80.6	1.6	0.0	7.8	2.8	0.8	6.4

VII (Dr. Bennett, Oregon, Wis.).—January 5, 1910. , white, 64. In October, 1909, general glandular enlarge-

Date.	R. b. c.	W.b.c.	N.	E.	B.	S. L.	L. L.	L. M.	Tr.
X. 24, '09.......	3,200,000	4,480							
I. 5, '10.......	....	......	54.8	4.2	0.4	20.0	9.8	1.6	9.2

Case VIII (Dr. Yates).—Male, white, 33. Onset in March, 1907, with supraclavicular glandular enlargement. In September, 1908, supraclavicular and left axillary glands most enlarged. Some enlargement of right cervical, axillary and inguinal glands. October 30, 1908, excised gland shows typical and advanced Hodgkin's disease. Death occurred May 20, 1909. Blood count:

Date.	N.	E.	B.	S. L.	L. L.		L. M.	Tr.
I. 10, '09.	76.2	1.4	0.6	7.6		6.0		8.2

Case IX (Dr. Yates).—October 3, 1910. Male, white, 5. Marked enlargement of left cervical glands of 5 months duration. Test gland shows well-marked Hodgkin's changes. Death from shock at operation. Blood count:

Date.	R. b. c.	W.b.c.	N.	E.	B.	S. L.	L. L.	L. M.	Tr.
X. 3, '10...........	5,160 000	4,200	54.4	2.4	0.2	22.6	8.6	2.4	9.4

Case X (Dr. Yates).—Male, white, cervical Hodgkin's. Count made 2 months previous to death of patient.

Date.	W.b.c.	N.	E.	B.	S. L.	L. L.	L. M.	Tr.
IV. 30, '10.........	14,300	84.	0.0	0.0	3.8	1.0	1.0	10.2

Case XI (Dr. Baird, Eau Claire, Wis.).—December 8, 1910. Male, white, 22. Enlargement of supraclavicular gland noted one year previous. Axillary glands enlarged at date. Test gland shows definite Hodgkin's picture. Blood count:

Date.	N.	E.	B.	S. L.	L. L.	L. M.	Tr.
XII. 8, '10.........	81.8	0.2	0.6	2.6	2.6	1.	11.2

When one examines these counts critically in an attempt to correlate the counts with definite stages of the disease process, he is confronted with difficulties arising from the facts that all parts of the lymphoid tissue are not affected, and further, that, of any large group of glands affected by the disease, the individual glands may show different stages of development of the process. Yet there are some points in the counts which stand out definitely. The most striking feature perhaps is the constant high percentage of the so-called transitional cells. This high percentage occurs not only when the total leukocyte count is approximately normal, but also is maintained even when there is a sharp leukocytosis. With a normal total count of leukocytes the percentage of transitionals approximates 10; with a very marked leukocytosis, as in Case VI (27,000), one may have a reduction (6.4 per cent); while in a leukopenia, as in Case V, the percentage rises to 17.8 in a total of 4800. The series indicates, then, that throughout the disease there is a relatively large number of these cells in the circulation. When one recalls that similar cells are found in smears from normal lymph glands, and also that in Hodgkin's disease there is a marked proliferation of the endothelial elements of the glands, it is difficult not to draw the conclusion that such a proliferation results in this excessive transitional content of the blood. Such a suggestion, however, cannot be considered as proved.

The lymphocyte count has varied much in these cases, but there is a definite tendency for a percentage decrease from a normal or slightly increased count in early and active stages to a very low count in later stages. Thus in Case IV we find

49.8 per cent of small and large lymphocytes in an active phase; in Case V, 31.6 per cent; in Case IX, 31.2 per cent. On the other hand, in the advanced cases, X, XI, III, we find from 4 to 8 per cent.

With this decrease in lymphocyte percentage, we find a corresponding increase in the polymorphonuclear count, from a relatively normal count during the course of the disease, to a relatively high count (76.2, 79.4, 81.8, 84 per cent) in the terminal stages or when the periglandular infiltration and induration are marked. The neutrophiles appear therefore to be unaffected except by extra-glandular processes and not by the changes taking place within the glands themselves.

Quite the opposite is the relation of the disease to the eosinophile. Eosinophiles are found in the glands in large numbers. Remembering that the count of cells in the peripheral blood represents but the ratio of supply to demand, it is not surprising to find very low counts of eosinophiles during the active progress of the disease (0.6 per cent or less in six of the cases). In reactive or quiescent cases, however, the count is higher, either toward the upper limit of normal, or slightly above. The highest count found was 8.6 per cent in Case II, if one excepts the 9.8 per cent found in Case V twenty-four hours after transfusion. If, as seems probable to the author, from a study of lymph glands at autopsy in a variety of conditions, the products of destruction of lymphocytes are positively chemotactic for eosinophiles, and if the findings above are not exceptional, the eosinophile count in cases of Hodgkin's disease would seem a good index of the progress or activity of the disease.

There is no striking change in the basophile count, or in that of the large mononuclears.

While these deviations of the Hodgkin's blood-picture from the normal are pronounced, the question naturally arises as to how they compare with counts in other diseases of the lymph glands. My series of counts in other conditions is not large, but in none of the conditions have I found the platelet-leukocyte picture that has been found in disease.

In tuberculosis of the gland the platelet count is in smears from four cases I have not found the which are common in Hodgkin's. The transitional cytes are on the upper limit of normal or slightly The four differential counts are as follows:

	W.b.c.	N.	E.	B.	S. L.	L. L.	L.M.	Tr.
1..........	9,000	41.6	2.4	0.0	43.2	4.4	0.4	8.
2..........	......	56.	1.8	0.2	26.4	5.	8.	[illegible]
3..........	......	63.	1.2	0.6	19.	6.	2.2	8.
4.....	......	64.8	1.8	0.2	19.4	6.	1.	[illegible]

In two cases of relatively acute non-specific following throat infections, the following differential obtained:

	N.	E.	B.	S. L.	L. L.	L.M.	Tr.
1.............. ...	72.2	0.2	0.2	14.6	2.2	1.8	[illegible]
2.....	47.8	4.	0.6	30.6	5.4	1.6	[illegible]

In these one finds quite the picture seen in early stages of Hodgkin's disease as far as the concerned. This is what one might expect, if the of the Hodgkin's picture given above is correct. In these cases the striking platelet-picture of Hodgkin's was lacking.

Finally, in one case of chronic simple sclerosis of the glands of obscure origin, there was obtained the count, with a low number of blood-platelets:

N.	E.	B.	S. L.	L. L.	L.M.	Tr.
72.	10.0	0.8	11.8	1.4	0.4	5.6

These counts are too few to establish a blood-picture various conditions, yet they do not vitiate the general clusions of the author from his study of Hodgkin's that the blood-picture is characteristic, is indicative of is transpiring in the glands, and may be, if carefully a help in diagnosis.

THE TRANSPLANTATION OF FREE FLAPS OF FASCIA.

AN EXPERIMENTAL STUDY.

By John Staige Davis, M. D.,
Instructor in Surgery, The Johns Hopkins University.

(From the Hunterian Laboratory of Experimental Medicine, The Johns Hopkins University.)

Introduction.—For some time I have been interested in the methods brought forward for replacing and for reenforcing weakened or defective tissues, and while some of the methods are admirable, all are limited in their application. It seemed worth while to search for a material which would accomplish the same purpose but would have a wider field of usefulness.

In looking about for some suitable tissue in the body which was easily obtainable, which had considerable strength, and at the same time was sufficiently flexible for any desired need, I was led to try the experimental transplantation of free flaps of fascia.

After proceeding with the experiments for some found that some excellent work had already been done this line.[1] However, my results were sufficiently to warrant a report on the subject, in order to again tention to this promising surgical procedure.

---

[1] Kirschner, M.: Ueber freie Sehnen- und Fascien tion. Beitr. z. klin. Chir., 1909, LXV, 472.

Günther: Ueber Duraplastic: eine Studie. Beitr. z. klin. Chir., 1910, LXIX, 740.

Hohmeier: Ueber ein neues Verfahren zur Trachealdefekten. München. med. Wchnschr., 1911, LVIII

Since this paper was handed in for publication the

—The part was shaved, washed with green soap ater, then with alcohol and ether. After the skin was ıghly dry it was painted with tincture of iodin, 2.5 per The iodin solution was also freely used in the open ls and after suture of the skin.

e black silk was the ligature and suture material used ;hout. The wounds were closed in layers wherever pos- The skin was closed in every instance with the button- :itch.

sterile gauze secured by a bandage was used wherever ıgs were applied.

fascia was obtained, for the most part, from the thigh, .o-tibial band of the fascia lata being the most satis- / portion to work with, as it is easily separated from the .ying tissues. In a few instances the strong abdominal was employed.

fascia was transplanted in both single and double and in one or two instances was twisted.

each experiment where adhesions were not desired the lata (ilio-tibial band) was placed with the inner or surface exposed. For example, when a flap of fascia aced in a peritoneal defect, the muscle or smooth side ırned toward the peritoneal cavity, and it was found ense adhesions were less likely to occur than when the side was turned towards the cavity.

.his series, unless otherwise stated, the fascia was trans- d into the same animal from which it was taken.

attempt was made to place free flaps of fascia on the s tissues, in order to test its vitality and obtain an idea possibilities for clinical use.

eriments.—For convenience I have divided the series ght groups. To economize space I will only report a the typical experiments in each group.

I.—TRANSPLANTATION OF FREE FASCIA INTO SUBCU- .NEOUS TISSUE ON FAT, MUSCLE, PERIOSTEUM, NAKED)NE, CARTILAGE, TENDONS AND LIGAMENTS.

ɪMENT 6.—Male, black mongrel; about 9 months old.

tion.—November 22, 1910. A piece of fascia lata was in the subcutaneous tissue of the chest wall. The wound sed in the usual manner. Dry dressing. Condition on the table excellent. *Per primam* healing.

ary 23. Distemper. The animal was sacrificed. *Autopsy.* ascia was somewhat thickened but otherwise it seemed It was strong and tough.

generation.

EXPERIMENT 7.—Female, white fox terrier; about 6 months old.

Operation.—November 28, 1910. The sartorius muscle was exposed and a broad band of fascia lata was sutured snugly around it. The wound was closed in the usual manner. No dressing. Condition on leaving the table excellent. *Per primam* healing.

January 16, 1911. Animal sacrificed. *Autopsy.*—The fascia was somewhat thickened but otherwise it seemed normal. The fascia band could be easily stripped from the muscle.

Histology.—(Microscopic examination.) The sections showed normal fascia with no signs of degeneration.

EXPERIMENT 8.—Female, tan mongrel; about 6 months old. November 29, 1910. A flap of fascia lata was removed from the thigh and wrapped in moist salt gauze and then placed in the ice box in a sterile jar.

Operation.—December 1, 1910. The fascia which was placed in the ice box 48 hours before was sutured on the ribs, under the muscle. The wound was closed in the usual manner. Dry dressing. Condition on leaving the table excellent. *Per primam* healing.

January 24, 1911. Animal sacrificed. *Autopsy.*—The fascia was thickened but otherwise it seemed normal. It was movable on the ribs.

Histology.—(Microscopic examination.) The sections showed normal fascia with clearly stained nuclei and fibers.

EXPERIMENT 9.—Male, black and white fox terrier; about 2 years old.

Operation.—December 1, 1910. The right femur was exposed and the periosteum was stripped back for about 2 cm. Into this defect a band of fascia lata was sutured around the bone. The wound was closed in the usual manner. No dressing. Condition on leaving the table excellent. *Per primam* healing.

December 27. Death from pneumonia. *Autopsy.*—The band of fascia was somewhat thickened and was intimately blended with the periosteum on either side. The structure of the fascia could be plainly seen.

Histology.—(Microscopic examination.) The sections showed normal fascia with no signs of degeneration.

EXPERIMENT 43.—Female, white mongrel; about 2 years old.

Operation.—March 14, 1911. The trachea was exposed and a large flap of fascia was sutured on it. This fascia had been removed from another animal on February 7, 1911, and had been in cold storage since that date. The wound was closed in the usual manner. Dry dressing. Condition on leaving the table excellent. *Per primam* healing.

April 10. Death from distemper. *Autopsy.*—The fascia was somewhat thickened but otherwise it seemed normal. It was closely adherent along the margins and seemed to blend with the tissues on the surface of the trachea.

Histology.—(Microscopic examination.) The sections showed normal, well-nourished fascia.

Comment.—In this group free fascia flaps were successfully transplanted into the subcutaneous tissue, into fat, on muscle, periosteum, bone, cartilage, tendons and ligaments.

Microscopic examination of the specimens showed that the fascia retained it own structure after transplantation and was apparently healthy and well nourished. This was true

---

ental-clinical articles have appeared. They will be con- fully in another report.

eier, F.: Experimente über Verschluss von Wunden und ickung von Defecten Schleimhauttragender Körpercanäle ılen durch freie auto-plastic. Arch. f. klin. Chir., 1911,

F.: Neue Wege der plastischen Chirurgie. (Verschluss erbrückung.) Arch. f. klin. Chir., 1911, XCIV, 326.

D. & Davis, C. B.: Experimental Direct Transplantation n and Fascia. J. Amer. Med. Assoc., 1911, LVII, 540.

[2] I take this opportunity of thanking Dr. C. D. Deming for assistance in the histological examinations.

even after the fascia had been kept in cold storage for thirty-five days and then transplanted into another animal.

The clinical uses suggested by these experiments are of considerable importance, and cover a wide field.

GROUP II.—TRANSPLANTATION OF FREE FASCIA INTO TENDON AND MUSCLE DEFECTS.

EXPERIMENT 16.—Male, black mongrel; about 6 months old.

Operation.—December 19, 1910. The right tendo Achillis was exposed and a section about 2.5 cm. long was removed. The stumps were held in position by a strong tension suture, and then a flap of fascia lata was placed in the defect so as to surround the stumps like a tube. This tube was then drawn tight and the ends were securely sutured around the stumps. The tension suture was cut and the dead spaces obliterated. The wound was closed in the usual manner. Dry dressing. Condition on leaving the table excellent. *Per primam* healing.

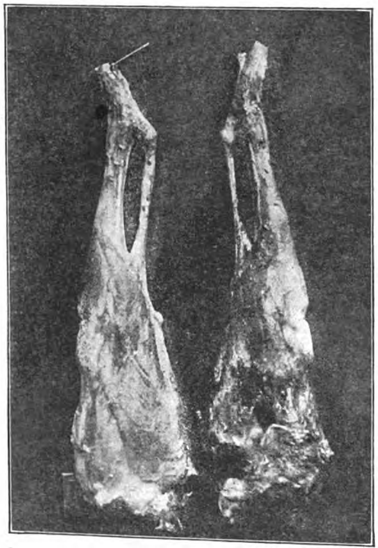


FIG. 1.—*Experiment 16.* Fascia to replace tendo Achillis. Operation, December 19, 1910. Specimen removed, March 7, 1911. Comparison of new and normal tendons. The new tendon is thicker than the normal. The + marks the operated leg.

March 7, 1911. Distemper. Sacrificed. The animal had been very active and had no limp. It was imposible to tell which leg had been operated on without close inspection. *Autopsy.*—The replaced tendon was thicker than normal, but seemed strong and satisfactory in every way. (Fig. 1.)

Histology.—(Microscopic examination.) Cross section of the new tendo Achillis showed normal staining fascia which was folded on itself. Surrounding the fascia was connective tissue, which caused the apparent thickening of the new tendon.

EXPERIMENT 20.—Male, white fox terrier; about 4 months old.

Operation.—January 3, 1911. The sartorius muscle was exposed and a section about 2.5 cm. long was removed. The muscle ends were held in position and a flap of fascia lata was sutured into the defect surrounding the muscle stumps by a tube of fascia. The dead space was obliterated and the wound was closed in the usual manner. Dry dressing. Condition on leaving the table excellent. *Per primam* healing.

February 1. Death from pneumonia. Since the healing the animal had been very active and no difference could be detected in the gait. *Autopsy.*—The fascia was firmly united muscle ends. (Fig. 2.)

Histology.—(Microscopic examination.) The sections fascia with fibers and nuclei clearly stained.

Comment.—This group shows that muscle and fects may be bridged by free flaps of fascia. Mus may be bridged by means of fascia flaps and thus amount of the muscle function saved. The fasci firmly with the muscle ends and formed a strong band between them.

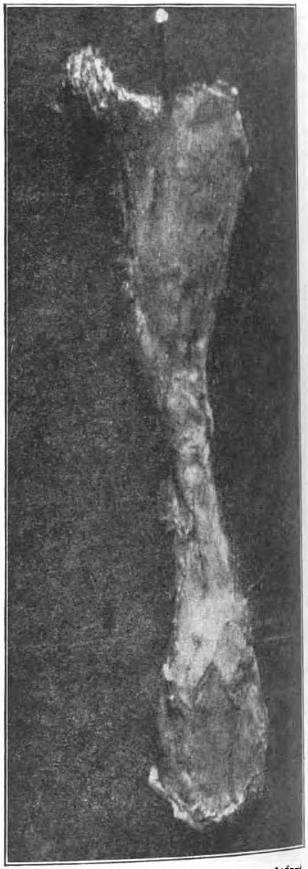


FIG. 2.—*Expcriment 18.* Fascia replacing defect in muscle. Operation, December 27, 1910. Specimen January 14, 1911. The thick muscle ends can be seen. necting them is the fascia which has united firmly to the

The use of fascia flaps to replace tendons is of importance and most promising clinically. While well-known fact that free tendon transplantation can cessfully done, it must be borne in mind that it is ofte cult to secure either long or short pieces of tendon doing considerable damage.

There are large amounts of fascia available in th which can be secured without damage to any other part. Thus tendons of any desired length might from strips of the ilio-tibial band of the fascia lata.

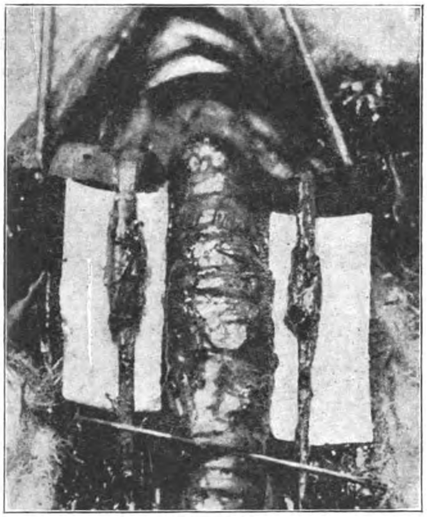
might also be used to prevent tendons from being caught r tissue. The final results after replacing tendons with naterial are more satisfactory than with any foreign ial or transplantable tissue with which I am familiar.

UP III.—TRANSPLANTATION OF FREE FASCIA AROUND VESSELS AND NERVES.

ERIMENT 33.—Female, black and yellow mongrel; about 1 ld.

ration.—February 14, 1911. The right jugular vein was ted out and a flap of fascia lata was wrapped about it. vound was closed in the usual manner. Dry dressing. ion on leaving the table excellent. *Per primam* healing. ch 3. Death from pneumonia. *Autopsy.*—The fascia was ned but otherwise seemed normal. It was quite adherent vessel wall. The lumen of the vessel was not encroached

logy.—(Microscopic examination.) The sections showed ucture of the vessel to be normal. It was surrounded by of fascia which was apparently well nourished and no signs of degeneration.



3.—*Experiment 41.* Fascia around vessels and on trachea. ion, March 14, 1911. Specimen removed, April 11, 1911. right carotid can be seen a flap of fascia which was lanted immediately from the same animal. On the left and trachea are flaps of fascia from another animal had been in cold storage for 35 days.

IMENT 41.—Female, yellow and white mongrel; about 1 d.

tion.—March 14, 1911. Both common carotid arteries posed. Around the right carotid a piece of fascia lata ured, which had just been removed from the right thigh. the left carotid was sutured a piece of fascia which n removed from another animal on February 7, 1911, l been in cold storage since that date. The wound was n the usual manner. Dry dressing. Condition on leav- table excellent. *Per primam* healing.

10. Death from pneumonia. *Autopsy.*—The fascia on otids was thickened, but otherwise seemed normal. The lumen of the vessels was not encroached upon. (Fig. 3.)

Histology.—(Microscopic examination.) The sections showed apparently normal fascia in both instances. No signs of degeneration.

EXPERIMENT 44.—Male, black and white fox terrier; about 1 year old.

Operation.—March 21, 1911. The right sciatic nerve was exposed and a flap of fascia lata was sutured around it. The wound was closed in the usual manner. Dry dressing. Condition on leaving the table excellent. *Per primam* healing. Gait unaffected.

April 20. Distemper, animal sacrificed. *Autopsy.*—The fascia was thickened but otherwise seemed normal. It could be moved on the nerve to a slight degree. There was no constriction of the caliber of the nerve.

Histology.—(Microscopic examination.) The sections showed a normal nerve surrounded by well-nourished, apparently normal, fascia.

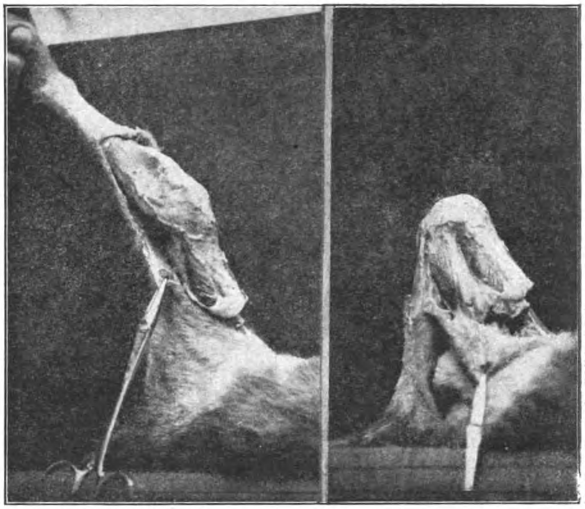


FIG. 4.—*Experiment 22.* Fascia filling defect made by removal of patella. Operation, January 9, 1911. Specimen removed, February 2, 1911. Note the amount of extension and flexion possible. The fascia can be seen firmly healed to the joint capsule.

Comment.—This group shows that free flaps of fascia may be successfully transplanted around arteries, veins and nerves, without in any way interfering with the lumen of the vessels, or compressing the nerves.

Clinically, fascia flaps might be of use in protecting suture lines in vessel surgery and in reenforcing weakened areas in vessel walls. The site of nerve plastic operations might be surrounded and protected by such flaps. It might also be of use in protecting a nerve after it was freed from callus or scar tissue.

GROUP IV.—TRANSPLANTATION OF FREE FASCIA INTO JOINTS AND FOR SUTURING FRACTURED BONES.

EXPERIMENT 22.—Female, yellow mongrel; about 6 months old.

Operation.—January 9, 1911. The left patella was removed and a piece of fascia lata was substituted for it. The fascia was folded on itself so that its inner smooth surface was next to the joint, and also under the skin. It was sutured to the capsule and the wound was closed in the usual manner. Dry dressing. Condition on leaving the table excellent. *Per primam* healing.

February 2. Pneumonia, animal sacrificed. The joint was freely movable and as far as could be seen had been as serviceable as the normal knee. (Fig. 4.) *Autopsy.*—The fascia was easily separated from the skin. It had adhered firmly to the joint capsule. On opening the joint the surface of the fascia was perfectly smooth. There were no adhesions. The fascia was slightly thickened.

Histology.—(Microscopic examination.) The sections showed a double thickness of apparently normal fascia. The staining of fibers and nuclei was well marked. (Fig. 5.)

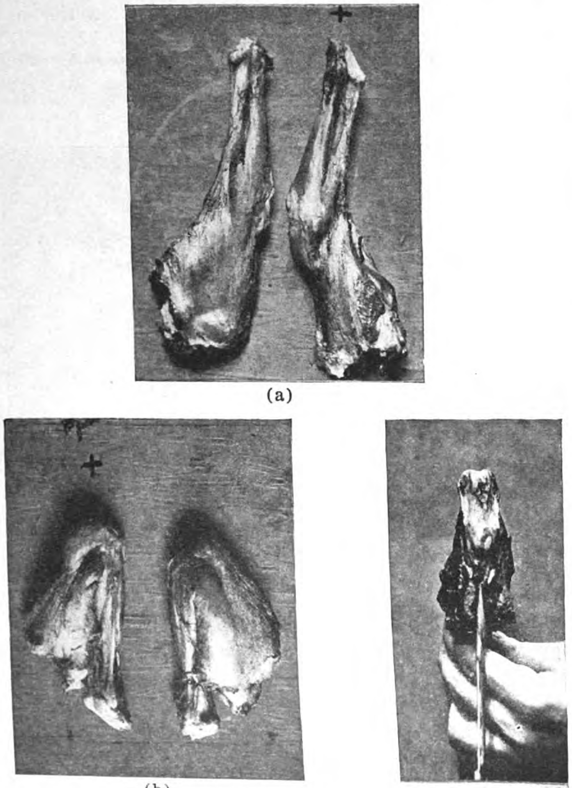


Fig. 6.—*Experiment 29.* Fascia into joint after removal of the cartilage. Operation, February 6, 1911. Specimen removed, February 28, 1911. (a) Leg extended, compared with normal. (b) Leg flexed, compared with normal. (c) Inside of joint. The + marks the operated joint.

Experiment 29.—Female, white fox terrier; about 8 months old.

Operation.—February 6, 1911. The right knee-joint was opened and the entire articular cartilage was removed as thoroughly as possible. Then a piece of fascia lata was inserted and sutured over the denuded portion of the femur and well up under the patella. The joint was closed. Dry dressing. Condition on leaving the table excellent. *Per primam* healing.

February 27. Death from pneumonia. Since the dressing was removed the animal has been using the operated knee-joint without apparent discomfort. *Autopsy.*—The joint was movable. The fascia was slightly thickened. It was adherent to the denuded end of the femur, but to no other portion of the
Its structure was well preserved. (Fig. 6.)

Histology.—(Microscopic examination.) The sections
normal staining, well-nourished fascia. No signs of
tion or absorption.

Experiment 31.—Male, yellow and white mongrel;
months old.

Operation.—February 13, 1911. The right tibia was
and the periosteum stripped back: The bone was sawed
and then two strips of fascia lata were passed through
holes and tied. The tied ends were made additionally
by sutures. The wound was closed and a small drain was
serted in the lower angle. Dry dressing, crinolin and
Condition on leaving the table excellent. The stitches
moved on the fifth day. The wound was apparently
healed. It was practically impossible to immobilize the
bone.

February 23. Distemper, animal sacrificed. *Autopsy.*—
moving the dressing the wound was found badly infected.
spite of the infection the strength of the fascia was
but little affected and the strips were still holding the
the bone together. This specimen was accidentally lost.

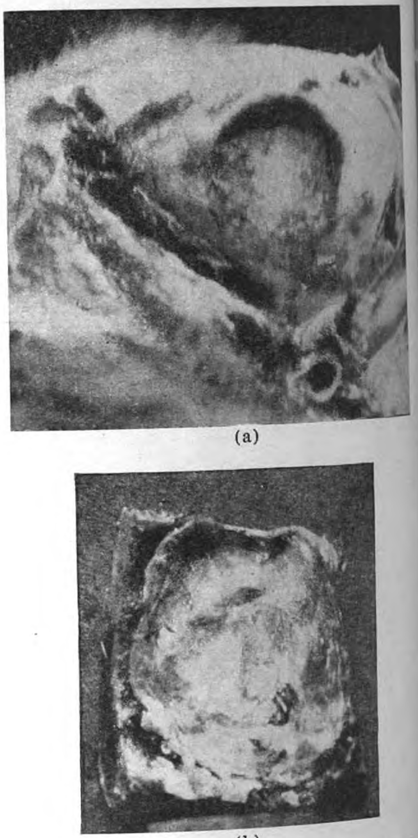


Fig. 7.—*Experiment 38.* Fascia into skull and dura
Operation, March 6, 1911. Specimen removed, April 20,
(a) Bone defect from outside with fascia adherent to bone
(b) From within the outline of the bone defect can be
The fascia is closely adherent to the dura which extends
yond it. The fascia is smooth except for one small
in the center.

ce the place of patellæ which had been removed. Both ese procedures are suggestive clinically.

nes were fractured and the fragments sutured with of fascia. The result of these last experiments were isfactory on account of the difficulty in immobilizing agments. However, the use of fascia strips in the open nent of fractures in human beings may be of great use ally, as immobilization can be secured.

e fascia does not act as a foreign body and has strength h to stand any reasonable strain put upon it.

p V.—Transplantation of Free Fascia into Defects in the Skull and Dura, also into Tracheal Defects.

eriment 38.—Male, yellow mongrel; about 1 year old.

ration.—March 6, 1911. The left temporal muscle with the ying periosteum was turned back and a ¾-inch button ne was removed. The dura under this area was excised flap of fascia lata was tucked under the bone edges. The n muscle side of the fascia was placed next to the brain. emporal muscle was replaced and sutured, and the wound losed in the usual manner. Dry dressing. Condition on g the table excellent. *Per primam* healing.

il 20. Distemper, animal sacrificed. *Autopsy.*—There was nall adhesion of the cortex to the central portion of the The edges of the fascia and dura were intimately d. The structure of the fascia could be plainly seen. The was tightly stretched across the bone defect and was nd did not bulge on pressure. (Fig. 7.)

ology.—(Microscopic examination.) The sections showed l staining, apparently well-nourished fascia.

eriment 62.—Female, black mongrel; about 1 year old.

ation.—June 12, 1911. The trachea was exposed and an mm. square was excised. Over this defect was sutured ly a flap of fascia lata. The wound was closed in the manner. Dry dressing. Condition on leaving the table nt. *Per primam* healing. There was no cough or any tory symptom following the operation.

3. Animal sacrificed. *Autopsy.*—The fascia was somethickened and firmly adherent to the surface of the . There had been no leakage whatever. On opening the from behind, the defect was made out as a very shallow sion and the fascia seemed to be entirely covered with membrane, which had grown over it. (Fig. 8.)

logy.—(Microscopic examination.) The sections showed ect filled by normal staining, apparently well-nourished Over this fascia, as a base, the mucous membrane had completely covering it. (Fig. 9.)

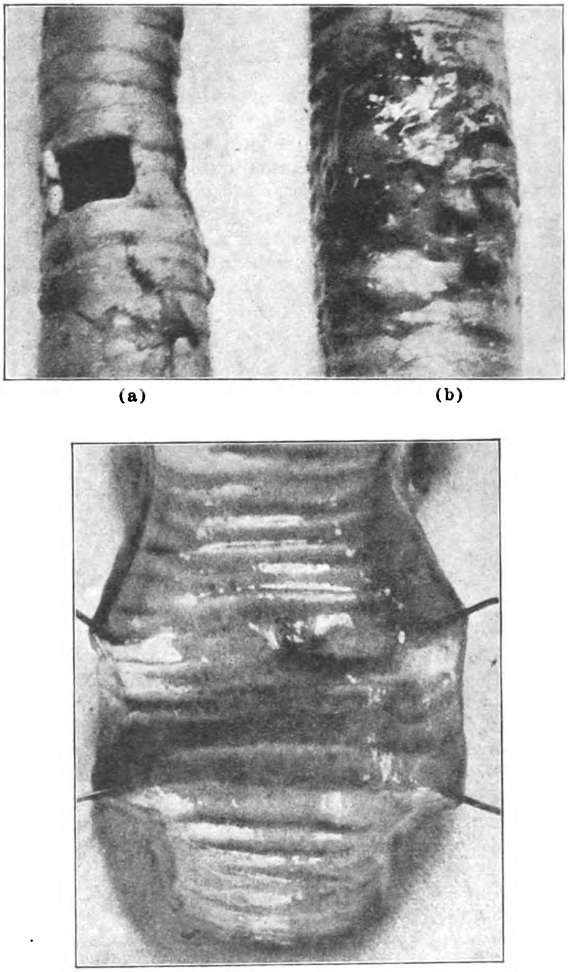
ment.—This group shows that flaps of fascia inserted l defects between the dura and bone edges will heal ve a strong membrane which will resist considerable e from within and without. When the dura is rein addition to the bone the fascia flap tucked under ne edges will unite with the dura and also become adherent to the bone edges.

e was in each instance a single fine adhesion of the o the center of the fascia flap.

a flaps might be used clinically in repairing skull ded as an aid in the closing of a spina bifida.

successfully used to cover prepared defects in the trachea, without subsequent infection, and that the mucous membrane grows across the fascia covering the defect.

It might be of use, clinically, in closing old tracheotomy wounds, where there has been considerable destruction of cartilage, and also in reenforcing sutures of the trachea.


(a) (b)

(c)

Fig. 8.—*Experiment 62.* Fascia over defect in trachea. Operation, June 12, 1911. Specimen removed, July 3, 1911. (a) Shows normal trachea with opening in it the size of that covered by the fascia. (b) The fascia healed over a similar defect. (c) The same specimen from within, showing a slight depression which marks the defect. The mucous membrane has grown completely over the fascia.

Group VI.—Transplantation of Free Fascia into Prepared Defects in the Abdominal Wall.

Experiment 17.—Male, white and black fox terrier; about 1 year old.

Operation.—December 22, 1910. All the tissues of the abdominal wall between the skin and the peritoneum were excised from an area about 4 x 7 cm. Into this defect a flap of fascia lata 3 x 6 cm. was sutured. The skin was closed in the usual manner. Dry dressing. Condition on leaving the table excellent. *Per primam* healing.

June 27, 1911. Animal sacrificed. *Autopsy.*—There was no hernia or bulging of the abdominal wall at the site of operation. From within there was no depression in the parietal peritoneum. On holding the specimen to the light the outline of the inserted fascia could be readily seen. The fascia itself was slightly thickened but normal in every way and was strong and tough.

Histology.—(Microscopic examination.) The sections showed normal staining fascia with no signs of degeneration.

Experiment 19.—Male, brown and black mongrel; about 1 year old.

Operation.—December 29, 1910. The peritoneum was exposed and an area 4 x 2 cm. was excised. Into this defect a piece of fascia lata was sutured. The wound was closed in the usual manner. Dry dressing. Condition on leaving the table excellent. *Per primam* healing.

February 7, 1911. Animal sacrificed. *Autopsy.*—The fascia edges had blended with the peritoneum. It was thickened but otherwise seemed normal. There was a small omental adhesion.

Histology.—(Microscopic examination.) The sections showed normal, well nourished fascia.

Experiment 46.—Male, yellow and white mongrel; about 1 year old.

Operation.—March 23, 1911. A section of the abdominal wall 3 x 7 cm., including everything except the skin, was excised. Into the peritoneal defect was sutured a flap of fascia lata from one thigh, and into the muscle defect a flap from the other thigh. The skin was closed in the usual manner. Dry dressing. Condition on leaving the table excellent.

The animal developed distemper three days after the operation and on the fifth day the skin wound broke down. There was no hernia as the fascia held firmly.

April 6. Death from distemper. *Autopsy.*—There was a crater like ulcer whose base was made up of fascia on which granulations could be seen both at the edges and scattered over the surface. There was no hernia whatever and the fascia seemed to be strong and intact. On opening the abdominal cavity there was free pus and this was also found in the pleural cavity. The omentum was adherent over a small part of the fascia. The fascia was incorporated with the peritoneum and had healed firmly in position.

Histology.—(Microscopic examination.) The sections showed infiltration with leucocytes, and marked signs of infection. The fascia was apparently in good condition with clearly stained fibers and nuclei. There was definite granulation tissue growing from the ulcer edges out on the fascia.

Comment.—This group shows that free flaps of fascia may be sutured into peritoneal and muscle fascia defects in the abdominal wall, and that it will incorporate itself with the surrounding peritoneum and muscle edges. A small omental adhesion was present on examination of the specimen in each instance, but in no case was there adhesion of the gut or any other abdominal organ to the fascia.

When a hernia was produced by the removal of a portion of the abdominal wall, except the skin, it was readily cured several weeks later by the transplantation of fascia flaps.

These experiments suggest the use of fascia flaps in the cure of large hernia where the muscle is atrophied, and for strengthening any weakened area in the abdominal or chest wall. The facility with which the fascia unites with the peritoneum suggests its further use in pleural and peri defects.

Group VII.—Transplantation of Free Fascia STOMACH, INTESTINE AND BLADDER.

Experiment 23.—Female, brown and black mongrel; year old.

Operation.—January 10, 1911. The bladder was brought through a mid-line incision and a flap of fascia lata was to it with a continuous suture. The bladder was dropped and the wound was closed in the usual manner. Dry Condition on leaving the table excellent. *Per primam* hea

July 27. Animal sacrificed. *Autopsy.*—There were adhesions to the fascia. The peritoneum on the surface bladder was somewhat puckered under and immediately the fascia edges. The fascia itself was thickened but oth seemed normal.

Histology.—(Microscopic examination.) Normal fascia found. The peritoneal covering of the bladder co be differentiated.

Experiment 24.—Female, yellow mongrel; about 6 mon

Operation.—January 16, 1911. The stomach was expos an incision 3.5 cm. long was made in it, down through the This was then closed with the Cushing continuous sti over the suture line was placed and sutured a flap of fas The stomach was dropped back and the wound was closed usual manner. Dry dressing. Condition on leaving the excellent. *Per primam* healing.

January 27. Distemper, animal sacrificed. *Autop* fascia was thickened but otherwise seemed normal. closely adherent to the stomach wall. There were a few adhesions to the fascia but these could be easily separate

Histology.—(Microscopic examination.) The sections the line of suture. Above this was the layer of fascia was apparently normal and well nourished.

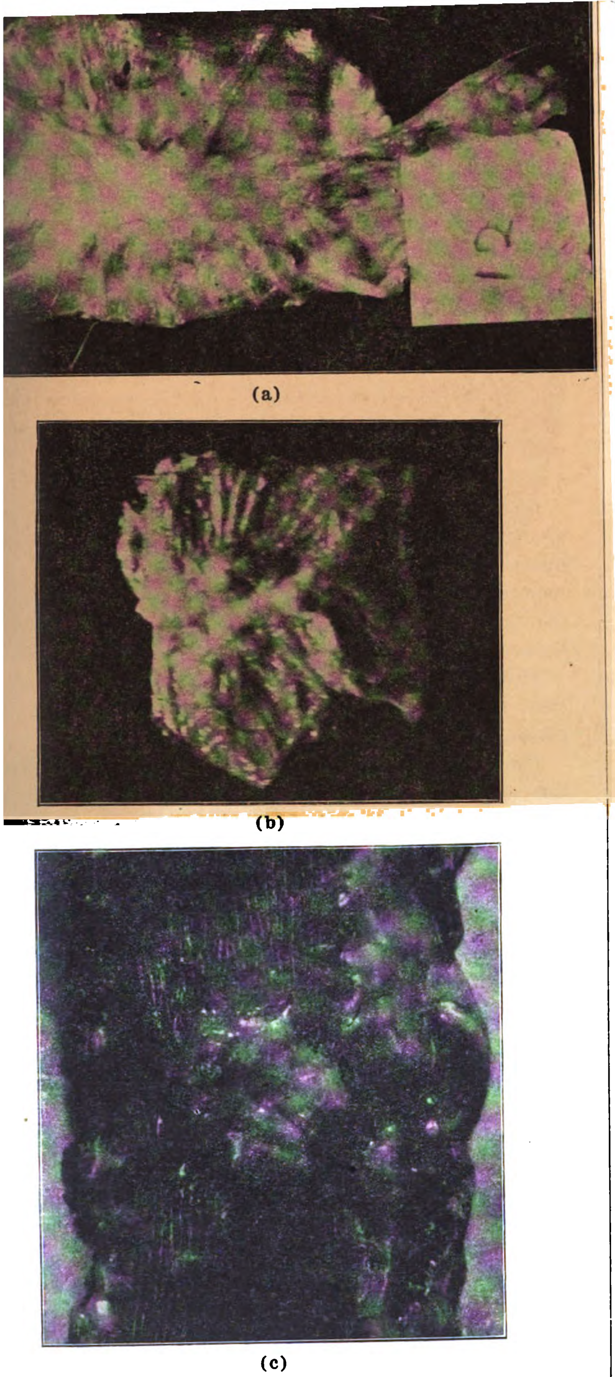
Experiment 61.—Male, black and white fox terrier; year old.

Operation.—June 5, 1911. A loop of gut was broug through an abdominal incision and a purse string sut placed opposite the mesentery. When the suture was tight and tied the portion within the suture projected The tip of the projection was cut off exposing the lumen bowel. Over this area a flap of fascia lata was sutured and the gut was dropped back. The wound was closed usual manner. Dry dressing. *Per primam* healing.

July 3. Animal sacrificed. *Autopsy.*—The omentum herent to the fascia but this was easily separated. The was somewhat thickened but otherwise seemed normal. closely adherent and seemed incorporated with the peri of the bowel. There was a definite puckering of the wal gut around and under the fascia. There had been no From within a small depression in the mucous membran ponding to the pucker made by the purse string could be

Histology.—(Microscopic examination.) The sections normal staining, well-nourished fascia. There was ma filtration of the tissue beneath the fascia with polynuc kocytes. There was a great mass of these cells in the corresponding to the made defect. On the surface of the was the remains of the adherent omentum.

Comment.—In this group free fascia flaps were fully transplanted onto the stomach, the intestine bladder. The fascia seemed to incorporate itself peritoneum (Fig. 10).



10.—*Experiment 19.* (a) Fascia in peritoneal defect. tion, December 29, 1910. Specimen removed, February 7, *Experiment 23.* (b) Fascia on bladder. Operation, January 11. Specimen removed, June 27, 1911. *Experiment 61.* (c) over defect in intestine. Operation, January 5, 1911. men removed, July 3, 1911.

ll of these the fascia was thickened. It was incorporated he peritoneum and there was a puckering of the peritoneum margin of the fascia. There was adherent omentum in se. A small tag can be seen in (a).

and weakened areas due to ulceration. It might also be of use in closing fistulæ of one sort or another.

GROUP VIII.—TRANSPLANTATION OF FREE FASCIA ON LIVER, KIDNEY AND SPLEEN.

EXPERIMENT 36.—Female, brindle mongrel; about 18 months old.

Operation.—February 21, 1911. Through a lumbar incision the left kidney was exposed and after the capsule was stripped back an abrasion of the surface was made and a flap of fascia lata was sutured over it. The hemorrhage ceased promptly. The kidney was dropped back and the wound was closed in the usual manner. Dry dressing. Condition on leaving the table excellent. *Per primam* healing.

March 7. Distemper, animal sacrificed. *Autopsy.*—The skin wound which had apparently healed became infected after the development of the distemper. The fascia was adherent to the surrounding tissues. It was not much thickened and seemed normal. It was tightly adherent to the kidney at the edges, but could be stripped up more easily in the center of the flap.

Histology.—(Microscopic examination.) The sections showed normal fascia closely adherent to the parenchyma.

EXPERIMENT 52.—Male, black mongrel; about 3 months old.

Operation.—May 8, 1911. Through a high mid-line incision a lobe of the liver was exposed. The end of the lobe was cut off with scissors leaving a bleeding area 3 cm. x 6 mm. Over this surface was placed a flap of fascia lata and the bleeding was markedly checked. The fascia covered the end like a shallow cap, and was held in position by mattress sutures passing through the liver substance and through both sides of the fascia. These sutures were drawn as tight as desired and did not cut through the liver substance. The liver was dropped back and the wound was closed in the usual manner. Condition on leaving the table excellent. *Per primam* healing.

June 6. Death from pneumonia. *Autopsy.*—There was adhesion of the omentum to the fascia. When this was stripped off the fascia was seen covering the denuded area like a cap. It was slightly thickened but otherwise seemed normal.

Histology.—(Microscopic examination.) The sections showed normal staining, well-nourished fascia surrounding an area of liver substance. It was adherent to a considerable extent.

EXPERIMENT 60.—Black and white fox terrier; about 1 year old.

Operation.—June 5, 1911. The spleen was brought up through a left rectus incision, the edge was trimmed with scissors, and a flap of fascia was sutured over the denuded area so as to bind it. The fascia was held with mattress sutures which passed through the spleen and both edges of the fascia. There was considerable hemorrhage until the fascia was applied and the sutures tied. The spleen was dropped back and the wound was closed in the usual manner. Dry dressing. Condition on leaving the table excellent. *Per primam* healing.

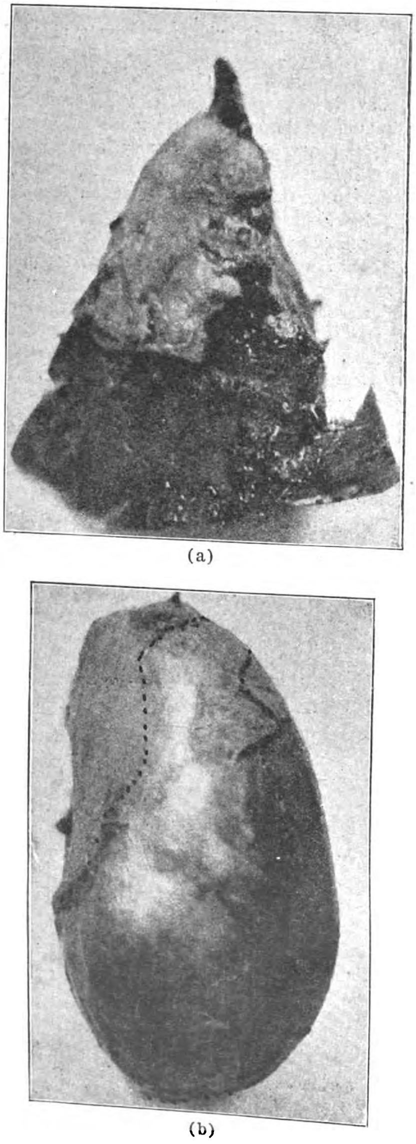
July 3. Animal sacrificed. *Autopsy.*—The fascia was thickened and securely bound the edge of the spleen. It seemed well nourished and it could be separated from the spleen quite easily.

Histology.—(Microscopic examination.) Sections showed normal staining fascia surrounding spleen tissue.

Comment.—In this group free flaps of fascia were successfully transplanted on the liver, kidney and spleen. It suggests that the fascia flaps might be used to support sutures in these organs, and also to bind raw post-operative surfaces (Fig. 11).

It is to be noted that the fascia when applied to a bleeding surface seemed to have a definite hemostatic effect which is comparable to the hemostatic action of bits of muscle, spoken of by Cushing.

The kidney might be suspended to the ribs or muscles in a sling of free fascia. These results are very promising.



(a)

(b)

Fig. 11.—*Experiment 25.* (a) Fascia on a lobe of the liver. Operation, January 17, 1911. Specimen removed, January 26, 1911. The fascia was thickened but was adherent to the liver surface over most of its extent. *Experiment 36.* (b) Fascia on kidney cortex. Operation, February 21, 1911. Specimen removed, March 7, 1911. The fascia is closely adherent to the kidney substance and blends with the capsule.

In both of these specimens, as in all the others, the fascia was well nourished.

Remarks.—In none of the animals have I noted a muscle hernia after the fascia was removed, but should it occur the hernia could be repaired without difficulty. There parently no untoward effect after removal of the fas as far as the use of the limb is concerned.

In every instance the fascia retained its own struc seemed well nourished. After removal from its bed as tough and strong as when first transplanted.

The great strength of the fascia, and, in addition thinness and flexibility are to be noted. It can be into a defect under considerable tension, and the sutures hold securely even when inserted close to the edges of the flap.

The great supply of this material and the ease with it can be obtained are important points.

There is some difference in the measurements of fascia before and after removal. For example: A out flap of fascia lata measured 4.5 x 2.5 cm. before and after removal it measured 3.3 x 2 cm. Another measured before removal 4.5 x 2.2 cm. and after 4 x 1.75 cm.

In several experiments fascia was drawn taut and around firm rubber tubes 0.8 to 1 cm. in diameter, and inserted in the subcutaneous tissue. These specimens removed after forty-nine and fifty-four days. The structure the fascia could easily be seen. Microscopic examin showed normal staining fascia with no signs of degen

This is interesting as it shows that fascia will receive cient nourishment if only one surface is exposed to tissue.

The type of so-called distemper prevalent in the lab this winter appeared to have some effect on the healing wounds and a number of them became infected. This seem due to a break in technic, as other animals opera the same morning (before and after these animals), identical technic, and not developing the distemper, di break down.

In several animals whose stitches had been removed per primam healing the skin wound subsequently broke after the development of distemper.

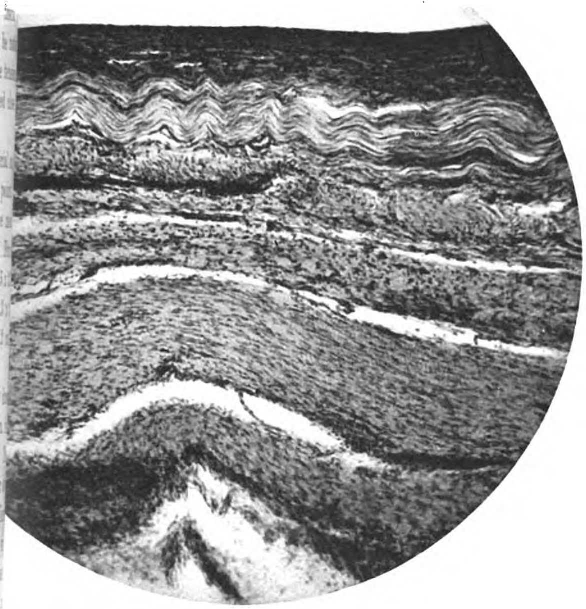
In the instances where there was infection the transpl fascia seemed particularly resistant to it, and retained structure after the breakdown of the surrounding tissue

Where there was tension on the fascia there was tively little thickening, but wherever the fascia was laid on a tissue there was always thickening, and unless was held flat with sutures it had a tendency to bunch up.

Once or twice the fascia flap was accidentally allowed partially dry out before it was transplanted, but, in spite this, it was moistened with salt solution and transpl The results were excellent and the fascia was nourished grew in its new position.

The question naturally arose as to the necessity of planting the fascia immediately, and also whether fascia one animal could be successfully transplanted into another

Experimentally, both of these questions have been an satisfactorily.



5.—(Microphotograph, Zeiss. Obj. AA. Oc. 3.) Two layers ia filling defect left by removal of patella. Section cut l to fascia bundles. The smooth dark staining layer at tom of the plate is the portion toward the joint cavity.

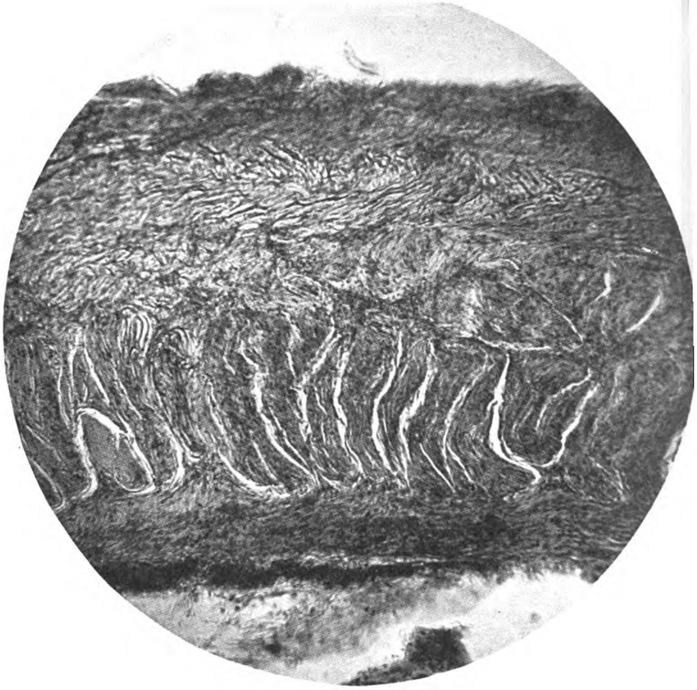


Fig. 12.—(Microphotograph, Zeiss. Obj. AA. Oc. 3.) Fascia preserved in cold storage wrapped in moist salt gauze for 35 days and then transplanted on the surface of a trachea. Operation, March 14, 1911. Specimen removed, April 10, 1911. The section is cut across the fascia bundles. The fascia is normal in appearance and stains well.

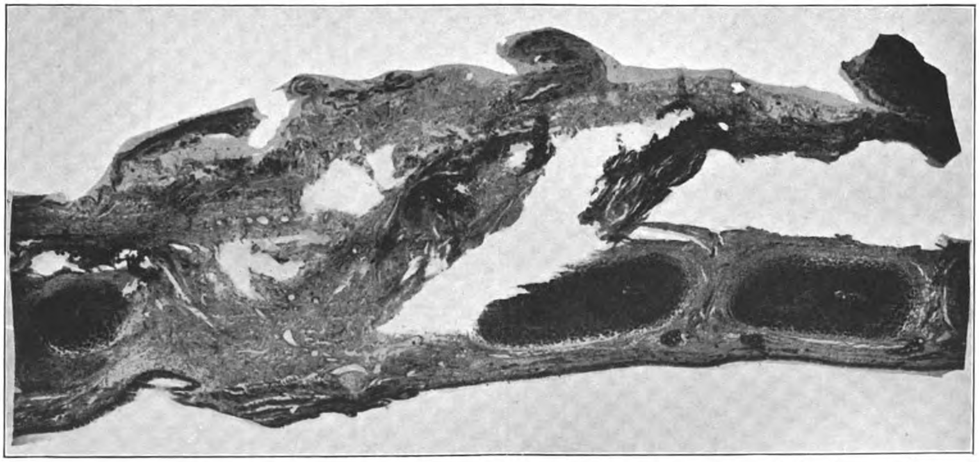


Fig. 9.—(Microphotograph, Zeiss. Obj. AA. Oc. 3.) Longitudinal section of fascia covering a tracheal defect. The defect can be seen between the tracheal rings. On the right of the plate the fascia has become accidentally separated from the surface of the trachea during the preparation of the section. The mucous membrane can be seen covering the fascia.

for as long as seven days; in cold storage at 32° C. ped in gauze moistened with salt solution for thirty-five and in cold storage at 32° C. in normal salt solution fty-six days. (Fig. 12.)

am sure that the number of days given here does not the greatest time that fascia may be preserved by the ods spoken of, but I mention the periods as a sugges- that suitable fascia might be preserved until needed for al use.

scia kept in salt solution appeared edematous when first ved from the solution, but the edema disappeared when issue was pressed with dry gauze. The edema was en- in the superficial connective tissue which had not been ved. The fascia kept in moist salt gauze, on the other , was normal in appearance.

ance of puckering or drawing up of the surface under the fascia and at its edges, somewhat similar to the effect of ordinary collodion on the skin. On this area, from within the organ, this puckering was not to be found and the lumen was in no way encroached upon.

The hemostatic action of free fascia flaps is noteworthy.

Conclusions.—The foregoing experiments give an idea of the great possibilities of transplanting free flaps of fascia and many suggestions for the clinical use of this substance may be drawn from them.

I feel convinced that many of the difficult situations arising during operations for the repair of weakened and defective tissues or for the control of bleeding surfaces will be simplified by the use of free fascia flaps and shall report the results of its use in such cases, with a consideration of the literature, in a subsequent paper.

NOTES ON NEW BOOKS.

essive Medicine. Edited by HOBART AMORY HARE, M. D., etc., ssisted by LEIGHTON F. APPLEMAN, M. D., etc. Vol. II. June, 911. (*Lea & Febiger: Philadelphia and New York, 1911.*)

ey contributes the chapter on "Hernia," Gerster that on gery of the Abdomen, Exclusive of Hernia," Clark that on ecology," Stengel that on "Diseases of the Blood, Diathetic letabolic Diseases; Diseases of the Thyroid Gland, Nutrition, he Lymphatic System"; and Jackson that on "Ophthalgy." It is interesting in looking over these quarterly es to consider how much or how little of all the literature permanent value; and whether an annual volume of limited night not be of greater value; but *Progressive Medicine* is edited and satisfies a natural demand of the profession.

tbook of Nervous Diseases. By WILLIAM ALDRED TURNER, D. (Edin.), and THOMAS GRAINGER STEWART, M. B. (Edin.) rice, $6. (*Philadelphia: P. Blakiston's Sons & Co., 1910.*)

s book contains 607 pages, including the index. It is well d, well illustrated, and well bound, opening well, but the al purple color of the binding is somewhat startling at The work is divided into nineteen parts, instead of rs, as follows: Anatomy and Physiology, Examination of ervous System in a Case of Nervous Disease, The Special , The Cranial Nerves, The Peripheral Nervous System, iseases of the Brain, Diseases of the Membranes, Diseases Spinal Cord, General Diseases of the Nervous System, otor and Trophic Diseases, Familial Diseases, Diseases cterised by Disorders of Muscular Function, Diseases of e Origin Characterised Chiefly by Disorders of Motion, ne and Periodic Headache, Hysteria, Neurasthenia, sthenia, Epilepsy, and The Tics. It will be generally that the above arrangement is an excellent one and extion of the work proves it. The authors have so often their ability to do excellent work in the past that it goes t saying that they have kept up their reputation in this mbitious undertaking. We find but little to criticise and a trivial nature. Here and there it would perhaps have etter to have enlarged somewhat on certain statements have gone more into details but of a necessity brevity have been sacrificed. One statement we feel should be modified and this appears in two forms, one on page 402, in speaking of the cerebro-spinal fluid, of progressive general paralysis: "The lymphocytes are greatly increased in number—to 150 or 200 or more [per] c. mm. of fluid—and the Wasserman reaction is present in 90 per cent or more of the cases (Mott)." And again on page 553 in discussing the diagnosis of neurasthenia from the neurasthenic type of early paralytic dementia it states as follows: "This occurs chiefly in adult males who have had syphilis. Such cases may, or may not, present physical signs of organic disease, such as loss of the tendon jerks, or reflex pupillary immobility. If these signs are found in association with neurasthenic symptoms, the onset of paralytic dementia may almost with certainty be diagnosed. The failure to obtain these signs of organic disease does not necessarily exclude the onset of paresis; therefore in those cases a lumbar puncture ought to be done and a cytological examination made of the cerebro-spinal fluid. If, on examination of the centrifuged deposit, the lymphocyte count shows 150 to 200 or more lymphocytes, the diagnosis of general paralysis may be made with complete assurance. Although an increase of the lymphocytes is present in most cases of cerebrospinal syphilis, yet the count is rarely so high as in the parasyphilitic diseases." The first statement is not entirely clear as the word *per* is evidently omitted between "more" and "c. mm.," but in regard to both of them we believe that the number is entirely too high, that with such a high count other organic symptoms will undoubtedly be present, and that no competent observer would be willing to make a diagnosis of paresis on a high lymphocyte count alone, no matter how high it might be.

American Practice of Surgery. Editors: JOSEPH D. BRYANT, M. D., LL. D. ALBERT H. BUCK, M. D., vol. VIII. Profusely illustrated. (*New York: William Wood and Co., 1911.*)

With this volume this stupendous system of nearly 9000 pages comes to an end. Both editors and publishers can feel well satisfied with the work, which covers the entire field of surgery as completely, or even more so, than any other system in English. Those who use it will be able to find what they want in it, except that the index is very incomplete, which is a serious defect in such a work. This volume includes chapters on Introthoracic Surgery, Surgery of the Spleen, Surgical Diseases and Wounds of the Kidneys and Ureters, Surgery of the Pancreas, Surgery of the Liver, Gall-Bladder, and Biliary Passages, Surgical Diseases, Wounds and Malformations of the Urinary Bladder and the Prostate, Surgery of the Ovaries and Fallopian Tubes, Surgery of the Uterus and its Ligaments, Extra-Uterine Pregnancy, and the Caesarian Section and its Substitutes. There are additional sections on The Law in its Relation to the Practice of Surgery, and Administrative Surgical Work, the latter including surgical needs of hospitals, and military, naval and railroad surgery. There is finally an Appendix with a chapter on the Relation of Blood-Pressure to Surgery, and a General Index.

Handbook of Treatment for Diseases of the Eye (Ophthalmic Therapeutics). By DR. CURT ADAM, Berlin. With a preface by PROF. VON MICHAEL, Berlin. Translated from the second German edition (1910) by William George Sym, M. D., etc., and E. M. Lithgow, M. B., etc. Illustrated. Price, $2.50. (*New York: Rebman Company, 1911.*)

This little book is devoted to the *treatment* of the diseases of the eye. While the propriety of separating the treatment from the description of the diseases may be questioned, yet it is sometimes very convenient, and it is possible some may like this book very much.

The treatment advocated for the various eye diseases is usually good, and will be found to give good results. The book states very definitely how to treat the various eye diseases, and if the instructions were even blindly followed the results would in almost every case be good and we suppose this means the book will be of value to some readers whose personal experience in such matters is small and who must necessarily follow some formal and definite plan in treating each disease. To all such readers we can commend this book as being about the best and safest of its class.

The Principles and Practice of Bandaging. By GWILYM G. DAVIS, M. D., etc. Third Edition, Revised. Illustrated. Price, $1. (*Philadelphia: P. Blakiston's Son & Co., 1911.*)

This work, which originally appeared in 1891, has been largely rewritten and the illustrations have been redrawn, so that it is practically a new book. As it exists to-day it is a first-rate guide for beginners as the author intends it to be. The drawings and text are both clear, so that a student should have little difficulty in mastering these principles. The author has divided his work into three parts: The Roller Bandages, The Tailed Bandages or Slings, and the Handkerchief Bandages. This arrangement with an abundance of illustrations makes it easy to acquire the practice of bandaging. The compactness and general excellence of this small manual will make it welcome to students.

Fractures and Their Treatment. By J. HOGARTH PRINGLE, M. B. (Ed.), F. R. C. S. (Eng.), Glasgow. Price, $5.50. (*London: Henry Frowde and Hodder & Stoughton, 1910.*) *Oxford Medical Publications.*

This book deals first with the general facts in relation to fractures. The usual causes, mechanisms, classification, and general diagnostic signs are discussed in the earlier chapters. Following this is a consideration of the process of repair, and of associated lesions of soft parts and joints. Fractures of particular bones are then described, with the methods of treatment, the anatomical sequence of the skeleton being pursued. The final chapter is devoted to the relation of fractures to the Workmen's Compensation Acts of England. At the end of the are presented several tables, compiled from various authorities, indicating the amount of depreciation in efficiency after certain injuries. The book is well and contains a good bibliography, the references to special being grouped together. The literary style of the work the usual clearness and purity of British authors. The of the subject-matter is far from being complete, the of most of the particular fractures being limited to a of general and well-known facts.

One wonders why such a book was written. There reason for this expenditure of time and labor on a already so fully and frequently treated, in every text-book articles to special volumes, unless there be light to shed of importance enough to justify the task illumination, if present, escaped the reviewer. The book especial fault except the deadly one of being commonplace unnecessary. The writer must have sensed the such criticism. In the preface he states that the Workmen's Compensation Laws have made of fractures paratively new subject, and further says that he was to write the book because no special work on the subject been published in England for a very considerable time last reason does not exist in this country, and one feels legal aspect of fractures was a prime motive in the of the book, that this phase of the subject has been given disproportionately small amount of attention. H. B.

Medical Guide and Monograph Series. Golden Rules of By JOHN ZAHERSKY, M. D., etc. With an Introduction C. W. SAUNDERS, M. D. Price, $2.50. (*St. Louis* *Mosby Company, 1911.*)

Although there is nothing on the title page to indicate this book has appeared before, the author has written "Preface to the Second Edition," which proves that have been welcome to certain members of the profession book has been carefully prepared and contains precepts are serviceable to the student. One might apply, however aphorism to "Golden Rules" of this and other branches science "that all is not gold that glistens." The success works is rather a sad reflection on the mental attitude doctor who finds them useful. If he knows his science should do he will not need them; and unless he knows science "Golden Rules" are but a snare and delusion.

A Monograph of the Anopheline Mosquitoes of India. By JAMES, M. D., etc., and W. GLEN LESTON, M. D., etc. Edition. Rewritten and enlarged. (*Calcutta:* *Spink & Co., 1911.*)

Although this treatise is intended mainly for workers in yet there is so much valuable information in it in regard mosquitoes, that all students interested in the transmission contagious diseases, especially yellow fever and malaria prize it highly. Its most beautiful and copious illustrations of immeasurable help in appreciating the differences the genera. The book is divided into two parts. Part I three chapters: 1, A general account of mosquitoes collecting, mounting and examination of anopheline and their larvæ; 3, The classification and identification Indian anophelines. Part II contains the description of genera. Drs. James and Liston are to be most gratulated on their admirable piece of work.

The Johns Hopkins Hospital Bulletins are issued monthly. They are printed by the LORD BALTIMORE PRESS, Baltimore. Subscription a year (foreign postage, 50 cents), may be addressed to the publishers, THE JOHNS HOPKINS PRESS, BALTIMORE; single copies will be mail for twenty-five cents each. Single copies may also be procured from the BALTIMORE NEWS CO., Baltimore.

OF

HE JOHNS HOPKINS HOSPITAL

Entered as Second-Class Matter at the Baltimore, Maryland, Postoffice.

II.—No. 249.] BALTIMORE, NOVEMBER, 1911. [Price, 25 Cents

CONTENTS.

PAGE

al Paintings of Velasquez. (Illustrated.)
JOHN W. CHURCHMAN, M. D. 383

Glycosuria. I. Ether Glycosuria.
JOHN H. KING, M. D., B. S. CHAFFEE, D. B. ANDERSON
nd L. H. REDELINGS 388

of Occlusion of the Various Hepatic Vessels Upon the
(Illustrated.)
M. C. WINTERNITZ, M. D. 396

ing of Experimental Pathology and Pathological Physi-
to Large Classes.
RICHARD M. PEARCE M. D. 404

PAGE

A Protest Against the Indiscriminate Use of the Organic Compounds of Silver in Ophthalmic Practice.
By SAMUEL THEOBALD, M. D. 407

Notes on Jaundice in Pneumonia.
By FLETCHER MCPHEDRAN, M. B. 408

Abdominal Lipectomy. Report of Two Cases. (Illustrated.)
By W. F. SHALLENBERGER, M. D. 410

In Memoriam. Dr. Christian Archibald Herter 411

Notes on New Books 412

THE MEDICAL PAINTINGS OF VELASQUEZ.*

By JOHN W. CHURCHMAN, M. D.,
Late Resident Surgeon, The Johns Hopkins Hospital.

is nothing whatever to show that Velasquez felt any r interest in the tasks of science or in its achieve- He certainly exhibited no feeling for medicine as a ı, or as one of the humanities. The approach of art e has often been more obvious. Other men, like , have made important contributions to each. Not ike Keats and Sainte-Beuve—have known, by de- the one for the other, the problems and interests Yet Velasquez' mind was of the type which enjoys ssionate observation of facts; and in this sense his view was at least a new one in art. Vision meant ıot what it had meant for his predecessors; it meant e of the five senses keenly developed and used with- or favor. Such sympathy with the method of espite any indifference to its content, it is not far- describe as intellectual kinship. In this man, art e drew near; and the gap between them was further by the fact that the actual phenomena which fell uez' way chanced to be the ones with which medi- self concerned.

as Velasquez' fascination by oddness and deformity of mind and body were, he was by no means unique in his choice of material which happens to have a medical interest. He was, indeed, quite unique in the extent to which his choice was of this character; but the field of medicine he shares with many other painters. There was Jan Steen, for example, in the Netherlands. Yet sunlight and shadow could hardly present a sharper contrast than did these two men; nor could bar-room, where the one idled away his days, and king's-court, where the other lived out his career. In almost every detail and circumstance of outward life and mental outlook what the one man was the other was not. The Dutchman brought to medical life the methods of pictorial art; his interest in medicine was casual and anecdotal. Velasquez was interested neither in episodes nor in events. He apprehended and constantly maintained the purely objective attitude.

The pictures of Velasquez which possess unusual medical interest, belong to the Dwarf and Jester Group.[1] With three exceptions, they were painted in the last ten years of his life and represent, therefore, his mature work. The earliest of them is the Geographer of the Rouen Gallery. (Fig. 1.)

; the meeting of the Johns Hopkins Hospital Historical 10, 1911.

[1] The two mendicants (Menippus and Aesop) and the Berlin del Borro (of somewhat doubtful authenticity), though allied to this group, should be separately considered.

The subject of this portrait is probably the same person as the one represented in the striking Pablillos de Valladolid (Fig. 2). The Bouffon Pernia (Fig. 3) and the Don Juan of Austria (Fig. 4) complete the Buffoon Group.

The Dwarf pictures fall into two groups according to the predominance of portraiture or pathology. In the first group Velasquez has immortalized those of his dwarfed every-day companions whose deficiencies were only physical. Here belong the El Primo (Fig. 5), the Don Sebastian de Morra (Fig. 6), the Don Antonio d'Ingles (Fig. 7), and the Don Carlos and his Dwarf (Fig. 8). The Don Carlos in the Riding School in the Westminster Collection, includes, in the background two court dwarfs; and mention should be made of the portraits of two fragile, stunted, royal children (Philip Prosper, Royal Gallery, Vienna, and Don Carlos, Wallace Collection, London).

More striking is the group in which the monstrous predominates. These are the pictures it is hardest to imagine a painter producing; yet Velasquez seems to have painted these prodigies "with care and pleasure, just as he would have painted a pretty woman—without a thought." One recalls Charles Morice's remark about Cézanne "A potato is as significant for him as a human face."

The most remarkable of this group is the El Niño de Vallecas (Fig. 9). It has been said that one can hear this idiot dwarf's nasal whine. But in the El Bobo de Coria (Fig. 10), pathology has gained even more complete mastery. All that there is appaling in an idiot face is here. The crossed eyes, the pallor, the pathetic leer—nothing which fidelity of draughtsmanship dictates has been omitted. Somewhat less gruesome is the Idiot of the Vienna Museum (Fig. 11) (called also The Laughing Boy); but its authenticity is not beyond dispute.

In the picture called Las Meniñas (Fig. 12) two dwarfs appear; but so far from dominating the scene they are quite incidental. Maria Barbolo and Nicolasico Pertusato stand in the lower right-hand corner of the painting. The former has a cretinoid face and figure; the latter is a hydrocephalic, his miniature form emphasized by the great dog at his feet. The painting is of royal personages; the royal playthings happen to be of the group.

It certainly was not the fact that Velasquez' career narrowed the material at his disposal and forced this curious choice of subject on him; nor that the life of the world of his day was calculated to shrink his intellectual concerns. Consider, for a moment, the world in which he lived; and see if you would expect it to inspire a painter to devote his talents to dwarfs and fools. It was a world in which kingdoms were being daily destroyed, thrones reoccupied over night, territorial boundaries readjusted with every swing of the pendulum, armies slaughtered like rats, undreamed of countries explored, traditions ruthlessly set aside. Not many years before Velasquez' birth Copernicus and Columbus had created a new heaven and a new earth; and his life-time was pitched in that period of novelty and enthusiasm and intellectual adventure which has given us our own heritage of emancipation and at which we
have never ceased to marvel. Erasmus, Savonar
thon and Sir Thomas More had not long been
Knox, Calvin and Loyola were names fresh in
potent in influence; and the mantle of leadersh
on a host of Velasquez' contemporaries, all of the
all time: Corneille, Racine, Molière, Descart
Spinoza, Leibnitz, Milton, Bunyan, Pope, Swi
Addison, Newton and Harvey. Not content with
tion of stars the managers of the political show
a monster carnival of intrigue and slaughter in
Wallenstein, Gustavus Adolphus, Cromwell, Rich
arin and a host of others were taking part.
drip with blood; bivouacs were never quenched;
sun greeted a fresh hero of carnage and adventu
task merely to list the events which brought abo
ration of the Teutonic nations from Rome, and
of progress from Italy and Spain to England
The pace had begun to tell, it is true, on Vel
country; but though Spain was being now distan
recently known, and was still knowing, glorious
80 years before the painter's birth Don Carlos I
inherited the rule over more extensive dominion
since the days of Charlemagne; and the fortun
had by no means waned when this extensively
tleman was chosen by the electors of Germany
of the Holy Roman Empire. In the life-time of
parents Spain was in her hey-day; and the paint
to an unexcelled heritage of national romance and
pride. He was destined, it is true, to see th
threatened; for, during his life-time, Spain
hitherto in the van of progress—began, like boys
end of a parade, to lose interest in the line of
wander up side alleys. The decadence was rapi
thanks to her king's conservative intellectual poli
keep step with civilization; and not a great deal of
flowed under the bridge before she had reached th
third-rate power. It is not without significanc
early days of her decadence, she should have pro
the most progressive minds in all art; and th
which, elsewhere in Europe, was touching scienc
life, should have singled out in Spain not a natu
pher, but a painter. No one would, of course,
expect European events—of no matter what ma
have any *direct* influence on the artistic material
man like Velasquez. Court painter though he was
never any danger that he become an artist of the
Crossing-the-Delaware type; he was immune to
so well called the anecdotal blight of the once-u
school. The exciting drama of European histor
turb him in his studio; and it is not strange that
But the drama was enacting, none the less; and
choice of sordid material was forced on him
splendid show in the world without.

It must be remembered, too, that Velasquez
lived in obscurity. He became a part—in the en
what important part—of the distinguished and

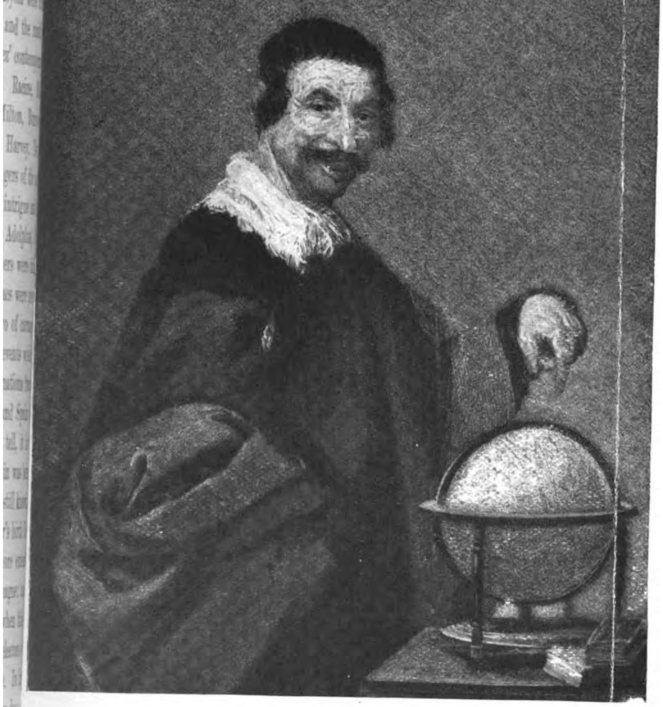


Fig. 1.

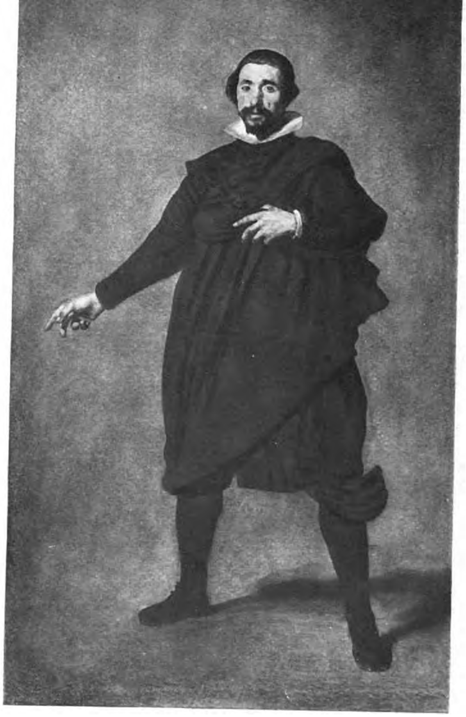


Fig. 2.

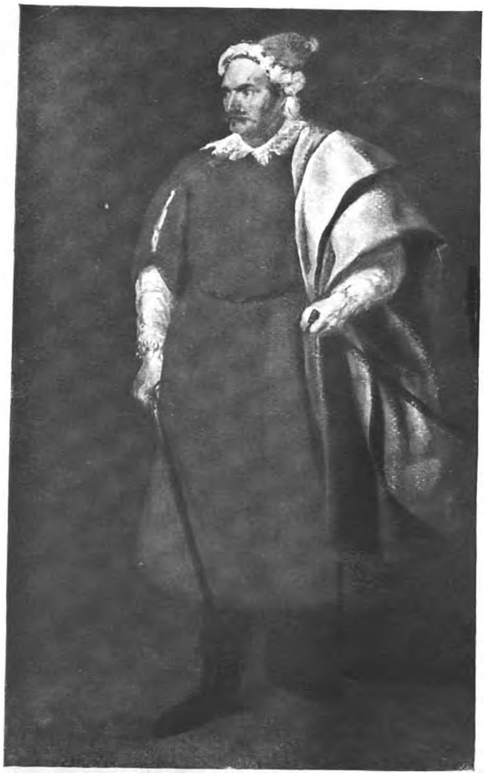


Fig. 3.

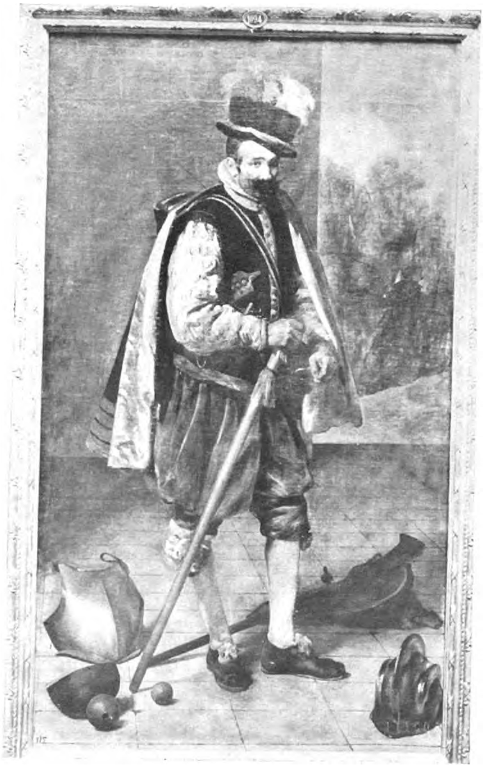


Fig. 4.

distinction. He was not even of humble parentage
ville—the city of his birth—was the glory of the
realms. His father, though poor, traced his ancestry
a Portuguese house to the kings of Alba Longa; and
llan mother, whose name the son has immortalized,
l to the hidalgas. His early advance was rapid. At
ked by influence—he had made for himself a secure
Madrid; had painted the king's portrait; had been
d court painter; and had been given a studio in the
nd a residence in the city. Painters were indeed in
ys none too highly respected;[3] but Velasquez' position
id gave him an opportunity for contact with men of
on in the various walks of life. In 1628, for instance,
the rare chance of a nine months' intimacy with
who had been sent to Spain on a diplomatic mission,
managed, during his stay, to awaken Velasquez from
tic lethargy and to persuade him to make the Italian
' In Rome he must have been a personage of some
r he lived first at the Vatican, then at the Villa
which was subsequently purchased by Colbert for the
Academy of Painting. He reached Spain again in
d "His Majesty," writes Pacheco, "was greatly
t his return." Then followed 18 years of productive
warded by many honors. In 1648 there was a second
to Italy and, on his return, the appointment as
of the Palace. It was in his capacity as Marshal that
nents for a royal journey to the Pyrenees[4] fell to
and here he contracted a "subtle, syncopal, tertian
f which he died (1660). Honors followed him to
; and he was attended in his last moments by the
op of Tyre and Patriarch of both Indies. Two years
had been invested with the Habit of Santiago; but
r a long discussion, during which a council had re-
hat they "approved his age, purity of blood and
but disapproved the nobility of his paternal and
ancestors." A dispensation for defective nobility
issued by Pope Alexander VI; and Diego de Silva
ed "hijo dalgo" by the king's order. The cross of
of Santiago was conferred, after the artist's death,
f the king.

of distinction, both at the court and on his European journeys, was hardly one to contract his intellectual interests. This is, however, not quite the whole story, for in spite of the influential position which Velasquez early obtained at the Spanish court, it was among the court underlings that many of his days were spent. In the court registers he appears among the dwarfs, jesters and barbers of the palace. As late as 1637 a list was published containing the names of dwarfs, jesters, musicians, barbers, etc., to whom were given clothes of grace. Here one reads "the clothes of the barbers and of Diego Velazquez may be reduced to 80 Ducats, and those of the officials of the wardrobe to 70."[5] In the list of places assigned to the spectators of a bull fight (1642), Velasquez is put in the fourth tier with the servants of the grandees, the barbers of the palace and other underlings. During the painter's trip through Italy the Ambassador at Madrid wrote to the Archbishop of Pisa, à propos of a visit Velasquez was about to make: "Be careful to say 'you' to him and not 'your excellency'; for after all he is nothing but a painter."

One must, of course, bear in mind the position of relative honor held by dwarfs and jesters in the courts of Velasquez' day. Spain, indeed, rather outdid England and the rest of Europe in this matter; though royal fondness for miniature men was an old and general hobby. In Scandinavian mythology dwarfs originated as maggots in giants; but in actual life their acute and active minds, their sensitive natures, made the maggots and not the giants the choice of kings and queens. Not only were the pygmies royal favorites; some of them were noted characters and a few, able men. Men like Philetus of Cos, Vladislas Cubitas,—King of Poland—and Pepin le bref, though of doll-like physique, were diminutive neither in mind nor in achievement. Strangely enough, however, the royal fancy did not always require an excess of mental endowment to offset the physical deficiencies. Bébé, for instance, the dwarf of Stanislaus of Poland, was practically an idiot; and the pet presented to Henrietta of France in a pie, could hardly have been highly regarded to be so lightly treated. Yet some of Velasquez' miniature associates were undoubtedly attractive and intelligent men. It is interesting to recall that Zuloaga, who has commemorated on canvas the repulsive features of his dwarfed servant, sometimes dreamed of collaborating with a great composer on an opera written about the life and death of that dwarf. "He was my servant," said Zuloaga. "A strange man, very hideous, physically distorted. But his life was wonderful. His death—he died of love."

The buffoons, too (*truhanes* or *hombres de placer*), possessing a sinister power, held a place in court by no means insignificant. "They represented," says Justi, "freedom of speech in its lowest degradation"; and, though employed ostensibly for royal amusements, they became a power by gaining the royal ear. Embassies were not infrequently entrusted to them; and instances are on record of wise men having played the fool in order to have the fool's influence with the

---

Rubens, then in the full maturity of his powers and
ght of his glory, was sent by Holland to Madrid on a
lating to the conclusion of peace between Spain and
he Spanish king wrote, complaining that "such im-
tters should be confided to a painter . . . . , to a man
inferior position."

teresting and significant that Velasquez escaped, in
of de Beruete, being "seduced by the magic concep-
bens." There is said to be one picture (a portrait of
on horseback in the Imperial Gallery of the Grand
uscany in Florence) which was at first attributed to
t is now supposed to have been painted by Velasquez
for the Taccas bronze statue at Madrid. I know of
ainting about which similar confusion could possibly

ney was made to celebrate the Treaty of the Pyrenees
war waged by Mazarin against Spain) and the be-
he Infanta Maria Theresa to Louis XIV of France.

[5] The ducat was worth about 23 cents.

king. "A vaudeville supported by his Catholic Majesty," Beruete has called this group of miniature and clownish men; but Velasquez' classification with them must be interpreted in the light of the place they held in the court life of the time.

His choice of these bizarre types for portraiture is of course not unique in art. Carreño, Rubens, Fortuny, Zamacois and many others have produced pictures of dwarfs. But Velasquez alone has painted a large series of this kind; he alone has entrusted his fate in so large part to so precarious a medium; he alone has introduced such subjects into his best pictures—into the picture, indeed, which, if all else he did perished, would still entitle him to a high place in art. These are sufficiently striking facts. One does not overlook the other work that Velasquez did; but the dwarf and jester group cannot themselves be overlooked, nor regarded as incidental. They form a large, an integral part of his artistic output.

There is no warrant for assuming that Velasquez' peculiar choice of medical material in his art indicated any spirited interest in medicine. Such an interest, if it had existed, would hardly have confined itself to a restricted and revolting clinical field; it might have been expected, as Steen's did, to select some of the more human aspects of medical life—aspects more likely to awaken interest and more certainly suitable to the purposes of art. Spanish medicine was, indeed, in no condition to arouse any vivid enthusiasm. The uprising of the Germanic spirit in the North and the gradual degeneration of the South were giving a new direction to the history of science. Every one is familiar with the galaxy of medical stars flashing in the Netherlands, in England, in France and in Italy; but Spanish names, if they are known to us at all, hardly match those in the list which includes Boerhaave and Harvey. Even during the days of her political supremacy Spain seems to have failed singularly to beget physicians of the very first rank. Lisbon, Salamanca and Alcala produced, of course, medical men of some importance; but, aside from the Belgian-born Vesalius not a single Spaniard achieved immortality in a day when physicians of other European countries were writing their names for all time.[6]

Consider, too, how abruptly Velasquez turned his face on his artistic precedents in painting these pictures. Painting, in contrast with Castillian architecture and literature appeared late and developed slowly in Spain; and it continued to be hemmed in by the straitest conventions. The three schools (of Castille, of Andalusia and of Valencia) differed in many respects, but they were one in their devotional character. The church was the sole patron of art; and most Spanish painters spent a part of, many of them all, their lives in convents and cathedrals. "The chief end of the works of Christian art," wrote Velasquez' own father-in-law, "is to persuade men to piety and to bring them to God."
Alcala and Salamanca," writes Sterling-Maxwell,
was always more popular than Cicero." Yet Vela
ing up in this tradition, became the painter of
the court rather than saints of the calendar."

It is interesting to speculate as to this extraordi
of subject on the part of a man of unexcelled
lived in an exciting world—the friend of celebrities,
mate of kings. Certainly such a man would hav
his artistic output to the still life, from which he
draughtsmanship; and line the galleries of Europe—
did—with melons and grapes that might have
country fair or with fish and sides of beef to
butcher's heart. Yet see how he did confine hi
The insipid Hapsburg face he must, as court pai
duce; a task, in itself, not altogether promisin
generating Hapsburg kings of Spain being, at th
the suburbs of imperial melancholy.[7] Yet Velas
free from this imposed task, did not flee to st
jects; he continued, in Beruete's phrase, to
hymn to ugliness"; and after leaving the ro
age, whose features are familiar solely becaus
painted them and whose name has small title t
brance save as the inventor of the *golilla*—
collars—Velasquez goes to the degenerate plaything
royal degenerate. It seems an obvious suggestion
painting of these creatures was ordered by their
owner and simply fell in Velasquez' day's work.
did he lavish such care on them; if they repelled
did he not—as others had done—introduce them in
where they could serve as foils for beauty? One
to appeal to the melancholy genius of Spain, to th
to brood over the idea of death, which those au
speak regard as much more characteristic of the
the notorious gaiety of southern Europe. Yet it is
absence of any feeling on the subject, which imp
strongly. It would be difficult to find a more perf
of objective painting. Not only, are no distress
of repulsive objects omitted; but what is much mo
because much rarer, is the absence of all effort to g
twist to things. The man who painted them
have had an emotion, and seems indifferent about
any. He handled skulls, he fondled them: but
"Alas, poor Yorick!" escaped his lips. One ima
gazing at these living abortions with senses ale
feelings all unstirred. And that, one may say
attitude of science, not of art. No doubt he pai
pictures simply because he wanted to; no doubt,
and jesters had aroused his interest, he gave al
thought to their fitness as artistic material. His
motives need not be sought for; but intellectual
to be an Andalusian trait, is apparent. And that is
ing light a consideration of this group of pictures th
man, marking him off from those who are inte

---

[6] In the note on Spanish medicine, which is appended, I have indicated some of the important physicians of the time and their achievements. No epoch-making names occur; but it is of interest to see that a few important early contributions were made (note especially the institution of the *Hospital dels folls* at Valencia and the work of Andreas a Laguna in genito-urinary su

[7] One of them (Philip II) on seeing a man
"Either that man is mad or he has been reading

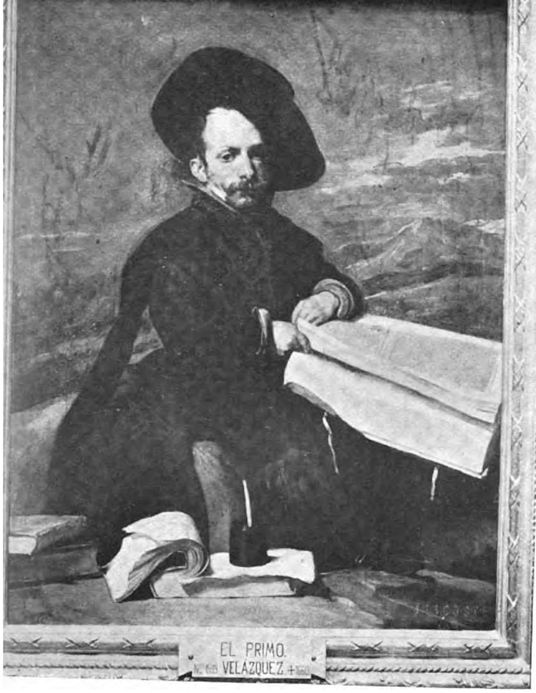


Fig. 5.

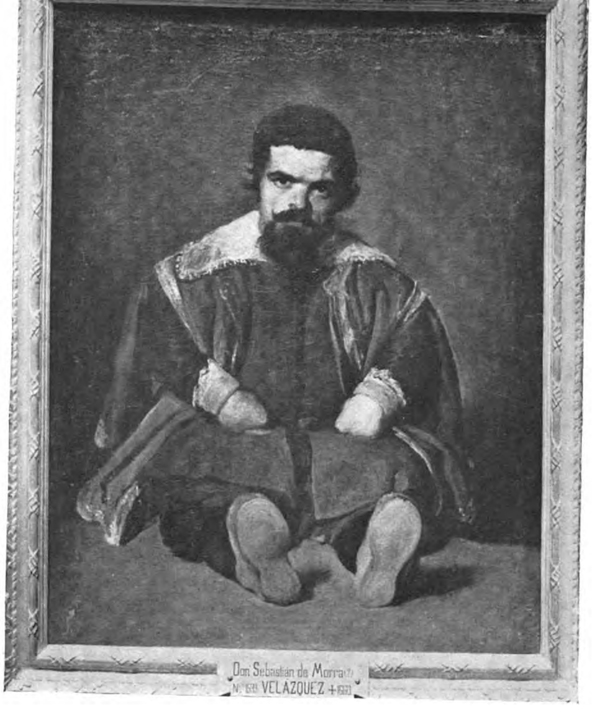


Fig. 6.

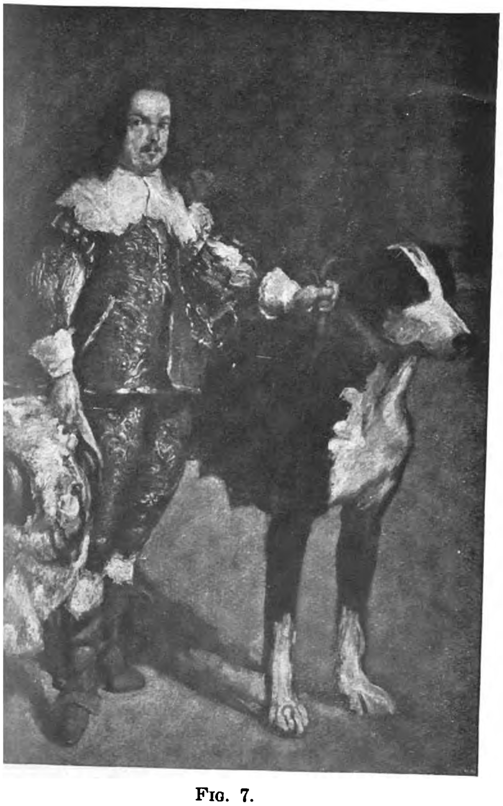


Fig. 7.

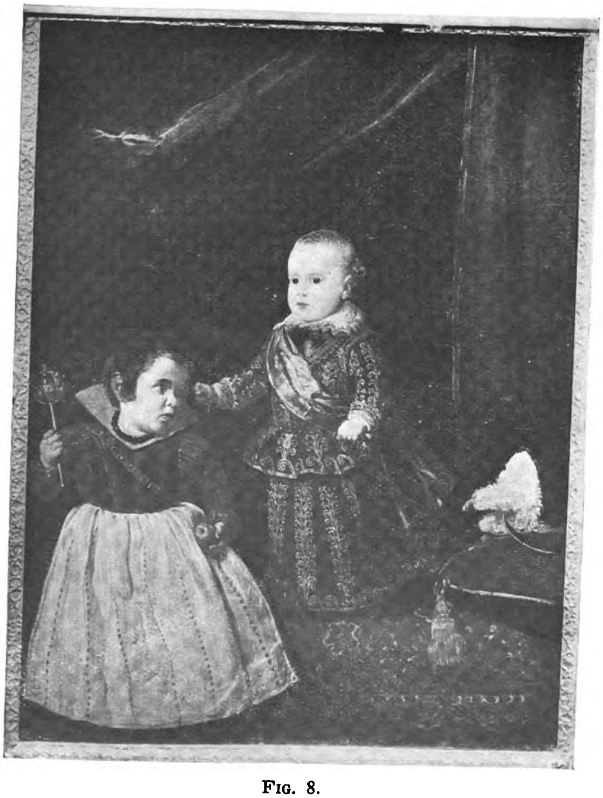


Fig. 8.

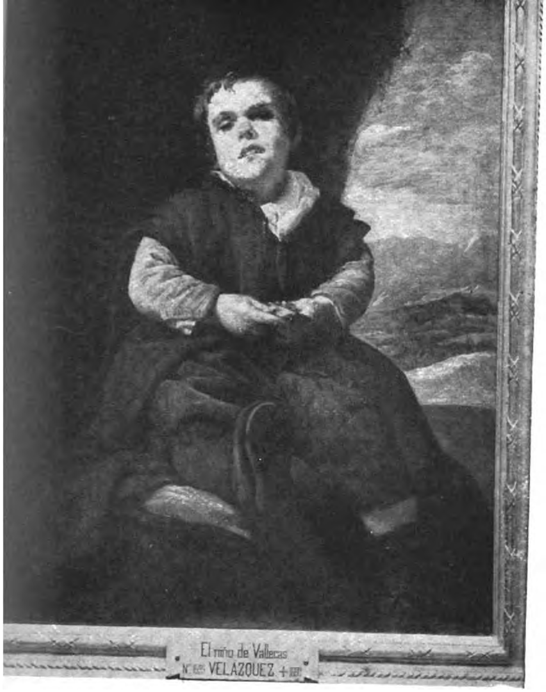


Fig. 9.

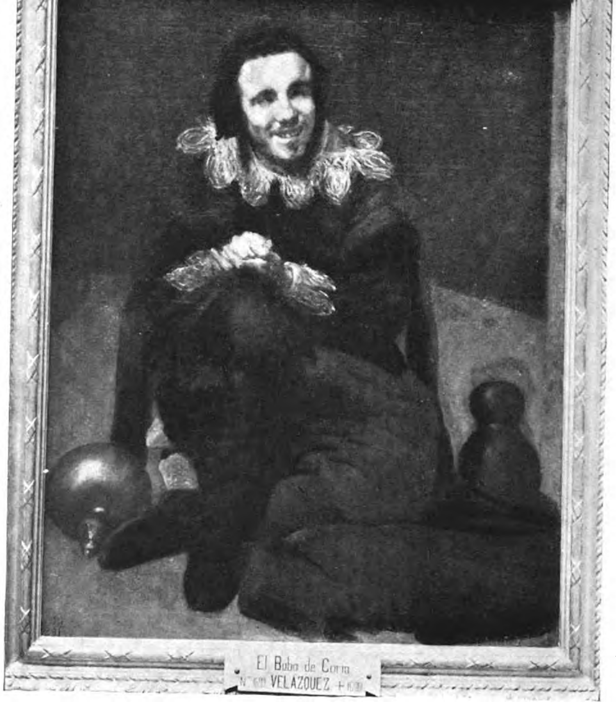


Fig. 10.

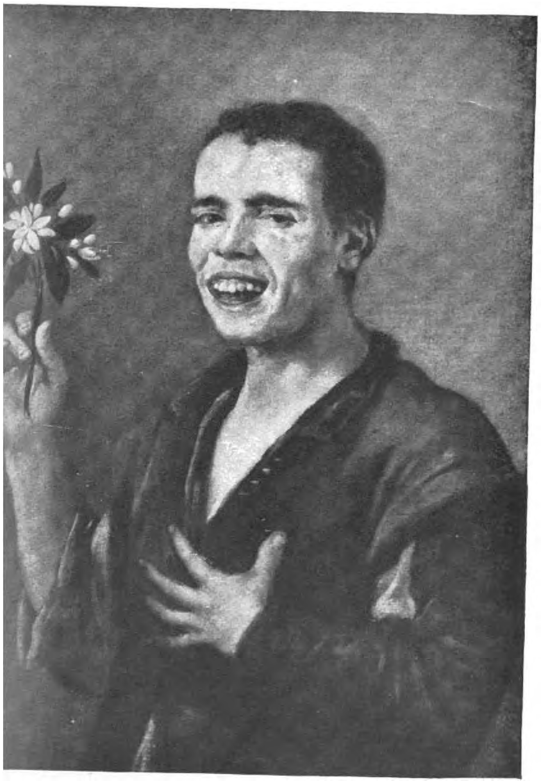


Fig. 11.

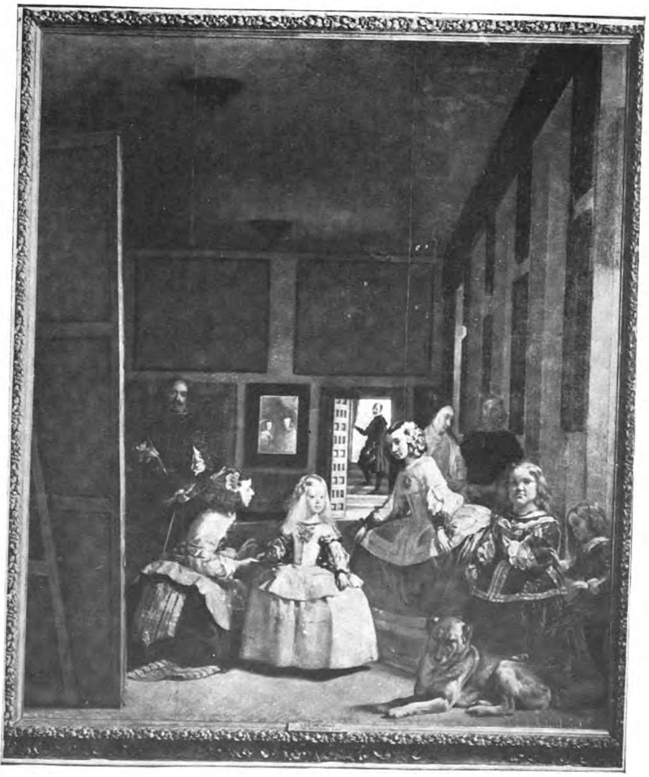


Fig. 12.

al to select him. On opening his eyes in the morning
; and jesters were the things in his field of vision; they
:d his artistic demands, in which imaginative needs
. little part. To their reproduction on canvas he gave
scientious draughtsmanship and an infinite talent; in
ng them to paint at all he was intellectually indolent
legree. Mr. Low has recently written of one of his
s: "He was a man (in Gautier's phrase) for whom
ible world really existed; and *therefore* he was inclined
e Velasquez the supreme place in art." Velasquez'
world was peopled by deformed and clownish men;
existence was real for him; beyond such a world one
ies he seldom looked.

ny rate, the importance of these pictures in the history
is of the greatest. They began a new era. One of them
no called the Theology of Painting; and though there
greement as to what he meant, there is general agree-
hat it was high praise. There are, of course, those now
: have always been those—who feel that the painting
rmed and clownish men is an artistic achievement of
qual value with learning to write with one's toes. Yet
raise—even worship—Velasquez has received from
s of varied temperaments. His voice—a modern voice
iæval times, a scientific voice in art—has hushed a
eal of talk about beauty as the sole concern of art.
not without his own artistic convictions. "I would
' he said to some one who suggested Rubens as a
"be the first of vulgar than the second of refined
." He even had a formula ("Truth, not painting")
though often quoted, may be made to mean whatever
. Yet it is certain he did not take rules of thumb very
y. One imagines his sombre face smiling quietly at
:. "A picture is a painted poem," said the ancient
; "I celebrate myself and sing myself," shouted Walt
n; "Art is simply and solely the effective transmis-
experience," writes Tolstoi; "Paint the soul, never
e arms and legs," was the friar's advice to Fra Lippo
'There is no excuse for art, unless it present some-
fferent from nature," wrote Goethe. There are the
; here are the paintings; and they do not fit. "Paint-
elasquez would probably have replied, in Corot's
'is not so complicated as you make out"; or in
nn's, "I write what I have seen, what I have felt,
ave experienced, and I write it as well as I can, that

gely enough, a Spanish poet (Quevedo) has used, in
g Velasquez, the very metaphor—almost the very
which have come to stand for the Shakesperian atti-
irt:

"Then deem the picture—by the skill,
That few shall reach and none surpass,
Delighted and deluded still—
The face of nature in a glass."

tributed to this artist in the early inventories of the palace, were destroyed in the fire at the Alcazar—among them three portraits of buffoons, descriptions of which (by Palermino) have survived. Beruete credits Velasquez with only 83 original paintings; Curtis describes a much larger number. In addition to the Menippus, Aesop and del Borro and to the portraits of sickly children (Philip Prosper and Don Carlos) there are 19 extant paintings belonging to the series of Jesters, Dwarfs and Idiots. The genuineness of Nos. 2, 5 and 19 is not beyond question; but in the case of the other 16 authenticity has been established.

PAINTINGS BY VELASQUEZ IN WHICH DWARFS, JESTERS AND IDIOTS ARE REPRESENTED.

I. Jesters:
*1. Pablillos de Valladolid. Prado, Madrid.
*2. Bouffon (Cristobal de Pernia). Prado, Madrid.
*3. Don Juan de Austria. Prado, Madrid.
*4. Portrait du Géographe. Rouen.

II. Dwarfs:
*5. Antonio d'Ingles. Prado, Madrid.
*6. El Primo. Prado, Madrid.
*7. Don Sebastian de Morra. Prado, Madrid.
*8. Carlos and his Dwarf. Copley Museum, Boston.
°9. A Dwarf with dog and parrot. Gallery Lord Ashburton.
°10. Two dwarfs leading a spotted hound. Louvre.
°11. A Spanish court dwarf. Royal Museum, Berlin.
12. Olivares and Balthasar Carlos with dwarfs. Gallery, Duke of Westminster, Grosvenor House.
°13. A dwarf seated reading. Gallery Señor Salamanca, Madrid.
°14. Prince Balthasar in riding school (similar to 12). Wallace Gallery.
*15. Las Meniñas. Prado, Madrid.
16. Die Infantin Margarete und die Zwergin. Maria Barbola.

III. Idiots:
*17. El Niño de Vallecas. Prado, Madrid.
*18. El Bobo de Coria. Prado, Madrid.
*19. Der lachende Bursche (or der Idiot). Royal Gallery, Vienna.

Pictures marked * are here reproduced; the mark ° before the title signifies that the gallery stated may not be the present site of the picture in question.

NOTE ON SPANISH MEDICINE IN THE DAYS OF VELASQUEZ.

Though Spanish names of the very first importance are wanting, Spanish physicians and surgeons in the XVI century were sufficiently active to have left their mark on the times. As early as 1545 a treatise on the operation for vesical calculus was in circulation (Juan Gutièrrez); and a number of publications appeared on the treatment of wounds and on trepanation. These treatises were written by the professors at Salamanca, at Seville, at Lisbon, and by the court physicians. One of the important monographs was by Bartholomé de Aguero (1531-1597), professor at Seville, who was a strong exponent of the immediate closure of wounds; in fresh wounds he advocated protection from air and the use of coagulating and drying materials. In Spain, as elsewhere, much energy was devoted to maintaining the traditions and recording the history of medicine; commentaries and translations were numerous; Hippocrates, Galen and Avicenna had their exponents. The author of one of the histories of medicine (Lusitanius of Lisbon) deserves especial mention for having advanced what is practically the accepted theory of "an epidemical constitution" and "a contagium."

The Spanish Galen (Andreas a Laguna) was an interesting figure of the times. Most of his life was spent at the court of Charles V. He was a physician, philosopher and statesman who lost his life in the plague at Metz. He wrote one of the earliest treatises on the treatment of urethral stricture with bougies. His book entitled "Methodus cognoscendi exstirpandique excrescentes in vesicae collo caruncula" must have been one of the very early works on the subject.

The most interesting figure was, of course, Vesalius. He was born in Brussels and held professorships in Padua, Bologna and Pisa. On the abdication of Charles V, Vesalius, who had accompanied him into Spain, went into the service of Philip II. Here, the court duties, the jealousy of Spanish physicians, the hatred of the clergy and the lack of anatomical material preyed on his melancholy temperament, and he decided to leave Spain and make a crusade to Jerusalem. On the death of Fallopius, he was called to succeed him in the Paduan professorship, but was shipwrecked on the way home and died in hunger and misery.

One of the most important contributions of Spain to mediæval medicine was the establishment of the *Hospital dels folls at* Valencia. It was here that probably the first effort was made to treat psychopathic patients reasonably and humanely. The hospital was founded in 1409 by Bernardo Andreu, following a mission conducted by the brothers Gilaberto Jafré in the cathedral. According to Lope (*Las Locos de Valencia*) this hospital was a show place and much frequented by visitors.

Other names that should be mentioned are:

Dionista Daça Chacon: Physician to Charles V, Philip II, Don Carlos and Don Juan of Austria; advocated non-poisonous nature of gunshot wounds.

Francisca Lopez: Physician of Charles V. Extracted Avicenna's Kanon.

Vallesius: Professor at Alcala, published explanations of the aphorisms, later quoted by Boerhaave.

Luis de Lemos: Professor at Salamanca; one of the first to make inquiry into the authenticity of the Hippocratic writings.

Roderigo a Castro: Author of an important treatise on gynecology: De universa mulierum medicina opus absolutissimum! 1603.

Mercado: Treatises on typhus, gynecology, obstetrics and children's diseases; famous work on the garrote.

Diaz: Professor at Alcala, known for writings on kidney diseases and the relation of vesical calculus to gout.

Boccangelino: One of the best authors of the XVI the plague.

Francisco Valles: One of the earliest pathological who, with Pedro Ximenes, attempted to elucid "De locis affectis," by anatomical work.

DESCRIPTION OF PLATES.

Fig. 1.—"Portrait d'homme dissertant sur une Museum at Rouen., Also known as "Portrait de Colomb" and as "Portrait du Géographe." Attributed and to Carreño. Supposed by Bonnat and Madrazo to retouched by Velasquez many years after it was Pablillos de Valladolid for a model. "Le mouvement devient tout naturellement un geste de moquerie à des navigateurs et de ces découvreurs de terres promènent leur curiosité inquiète autour de la le rire épanoui du bouffon se gausse de leurs (Louis Gonze: Gazette des Beaux-Arts, 1893.)

Fig. 2.—Pablillos de Valladolid, sometimes called The Subject supposed to be the same as that of the Rouen du Geographe."

Fig. 3.—Portrait of the Bouffon, Pernia. Prado, portrait is not regarded as a genuine Velasquez by

Fig. 4.—Don Juan of Austria, Bouffon of Philip IV, Madrid. Don Juan of Austria was a natural son of The name was also borne by a bastard son of Philip IV actress la Calderona.

Fig. 5.—El Primo. The Prado, Madrid.

Fig. 6.—Don Sebastian de Morra. The Prado, original was injured by fire and many of its details

Fig. 7.—Portrait of Antonio d'Ingles. The Prado, tonio was the dwarf of Philip IV.

Fig. 8.—Carlos and his Dwarf. Copley Museum,

Fig. 9.—El Niño de Vallecas. The Prado, Madrid.

Fig. 10.—El Bobo de Coria. The Prado, Madrid.

Fig. 11.—The Laughing Boy. Called also The Gallery, Vienna.

Fig. 12.—Las Meniñas. Called by Giordano The Theology of Painting. Las Meniñas were girls who assumed the womanly heels: they wore neither and like the pages in France, served their King and center of the picture stands the Infanta Maria is receiving a cup of water from the Queen's Maria Augustina Sarmiento. To her left Doña Isabel dropping a curtsy. The two dwarfs Maria Barbolo and Nicolasico Pertusato (hydrocephalic). A *guardadamas* in mid-background; far back on Queen's aposentador. In the mirror the reflections and Queen.

STUDIES IN GLYCOSURIA.

I. ETHER GLYCOSURIA.

By John H. King, M. D.,
Associate in Pathology, The Johns Hopkins University
and
B. S. Chaffee, D. B. Anderson and L. H. Redelings.
(From the Hunterian Laboratory of Experimental Pathology, The Johns Hopkins Medical School.)

The first investigator to call attention to the fact that a reducing body may appear in the urine after etherization was Ruschhaupt (1), who observed glycosuria, in two instances, in rabbits under ether. The presence of reducing materials in the [illegible] dogs following ether anæsthesia was independently observed by Geis and White and P. B. Hawk. lig (2) undertook a study of the question. In an he drew attention to several interesting results. found that ether inhaled for a longer or shorter marked glycosuria in healthy dogs. The time of hours in another. In general a reducing body will in the urine at the end of one hour if the narcosis is

quantity of reducing body in the urine can, with uresis, amount to 10 per cent, but the average is about per cent. Seelig thought that the glycosuria increased e length of the experiment. The glycosuria lasts only time. It disappears on an average of about 7 hours ıe discontinuance of the anæsthetic, but may last as 16 hours or even 24 hours. The glycosuria depends hyperglycæmia, as the sugar in the blood was found ed under the influence of the anæsthetic. The increase blood-sugar, however, Seelig points out may not be iking.

e glycosuria were dependent upon simple filtration of e through the kidney for its occurrence, then the sugar lood should be less after etherization. Such has never und to be the case, in the author's experiments, nor in Seelig thinks that there might be some participation of ney in the process, as he often found albumin in the

anæsthesia, Seelig states that the glycogen in the less, pointing to this organ as the direct cause of the ycæmia, by increased conversion of glycogen into glu- He points out some further interesting results which be found more advantageous to consider later in our Furthermore, in a second paper, Seelig considers the e of diet upon the occurrence of this type of glycosuria. gain it seems preferable to reserve this discussion for nsideration.

(3) pointed out that during and following ether sia the urine acquired considerable reducing power, but not consider that there occurred a sufficient hyper- a to account for it.

od (4) likewise observed the occurrence of glycosuria her, but also regards its influence on the blood-sugar y slight extent. The cause, he says, is a mystery. He the glycosuria as either due to some permeability of l epithelium, or that the anæsthetic may act upon r combination in the blood, increasing the amount of r, which is then immediately filtered off in the urine. interesting point is raised in this paper as to whether cing property acquired by the urine is due entirely to or in part to some other substance. Upon this point ts may throw some light.

hill (5) states that ether does not cause any notable the sugar content of the blood, when employed in e of slight anæsthesia, nor does it induce the passage ıcing body into the urine though the anæsthesia be 3-4 hours.

ld seem quite well established that ether, in common ral other drugs, possesses the power of inducing the f sugar into the urine.

more minutely the mechanism of ether glycosuria to make a few preliminary experiments to confirm its appearance. Accordingly, several dogs were anæsthetized with the ordinary routine ether for anæsthesia. The anæsthesia was deep in every case and the dogs chosen were all healthy active animals. It was found that a very definite reducing property was acquired by the urine after ether anæsthesia.

Experiment No. 1.—Dog, No. 80. Female. Diet: Meat and bread. Gave 300 cc. of water by stomach tube, 45 minutes before beginning of anæsthesia. Anæsthesia, 10 a. m. to 12 m. Amount of ether given, 150 cc. The urine drawn just prior to beginning of anæsthesia was negative to Fehling's test. At the end of 1 hour, animal was catheterized and 5 cc. of urine obtained. This completely reduced Fehling's solution in a test tube. No. albumin. Catheterized at 3.30 p. m. Urine, 38 cc. Fehling's +. Catheterized at 4.45 p. m. Urine, 35 cc. Fehling's +. June 28, 1910, catheterized at 9 a. m. Urine, 120 cc. Fehling's +.

***Remarks.*—Ether caused the appearance in the urine of a reducing substance at the end of 1 hour, which persisted for 24 hours.**

Experiment No. 2.—Dog, No. 112. Diet: Meat and bread. Animal was anæsthetized for 5 hours. Urine drawn at end of 20 minutes, after beginning of anæsthesia, reduced Fehling's solution very strongly. Urine drawn by catheter, 36 hours after end of anæsthesia, did not reduce Fehling's solution.

Experiment No. 3.—Dog, No. 80. Female. Diet: Meat and bread. Gave dog ether from 10 a. m. to 11.30 a. m. Amount, 150 cc. Urine drawn before beginning of anæsthesia was negative to Fehling's, and the polariscope. Urine drawn at the end of anæthesia turned the plane of polarized light 1° to right. A specimen of this urine greatly reduced Fehling's solution.

Some yeast was added to a specimen of this urine and allowed to ferment for 22 hours. At the end of this time, the urine was filtered and examined by the polariscope. The plane of polarized light was not turned at all. The urine was also negative for Fehling's. This demonstrates clearly that the reducing property acquired by the urine is due to dextrose.

Experiment. No. 4.—Dog, No. 80. Female. Diet: Meat and bread. Dog was given ether from 9.05 to 10.05 a. m. Amount, 13.5 cc. Urine drawn before beginning of anæsthesia was negative for Fehling's. Catheterized at 3 p. m. and 105 cc. of urine obtained. Tested quantitatively by Benedict's method, it showed 0.7304 gm. dextrose.

These experiments will suffice to confirm the previous findings in the literature that ether causes a definite glycosuria which may make its appearance as early as 20 minutes after beginning the anæsthesia, and disappears by the end of 24 hours. The reducing property of the urine is due to dextrose.

To explain the occurrence of ether glycosuria, it is obviously first necessary to know what changes the anæsthetic has upon the sugar content of the blood. Previous experiments from the literature indicate that a hyperglycæmia precedes (6) and causes the appearance of sugar in the urine. The results are, however, not in great harmony, and an accurate study of the conditions in the blood seemed desirable at this point. Accordingly several experiments were made to ascertain whether a hyperglycæmia occurred after ether anæsthesia and how large an increase in sugar in the blood resulted.

Method.—Healthy adult female dogs were chosen for these experiments. They were all fed upon the same diet, namely, 200 gm. of lean meat daily, and as much water as they chose to drink. Each experiment was conducted in the following manner: Under aseptic conditions and local anæsthesia 50 cc. of blood was drawn from the jugular vein into a weighed Erlenmeyer flask containing 5 cc. of 1 per cent sodium oxylate. The whole was then weighed and the weight of the blood thus obtained. The animal was then anæsthetized with ether for two hours and at the end 50 cc. more of blood drawn from the same vein under the same procedure. The animal was then placed in a cage and the urine collected for 24 hours in a receptacle containing 5 cc. of toluol. The blood was examined for sugar by the excellent method of Oppler-Bertrand (7), and the urine for sugar by the method of Benedict and the polariscope.

A word must be said here regarding the influence of diet upon the occurrence of ether glycosuria. Seelig (9) reports that if animals are fed for a long time on carbohydrate diet they do not react to ether by showing a glycosuria. The time necessary for such feeding is generally 3-4 weeks for a medium-sized dog. Occasionally the condition can be brought about in 10 days. However, if fed on a meat diet, the animal responds to the administration of ether by a well-marked glycosuria. In all of our experiments, with the exception of the preliminary ones, the animals were fed upon the same diet, namely, 200 gm. of lean meat daily.

The results of the experiments are given below.

Experiment No. 5.—Female. Dog, No. B 18. Drew blood from right jugular vein before anæsthesia.

1. Weight of flask + NaOx + blood = 112.30600 gm.
   Weight of flask + NaOx = 54.86300
   Weight of blood = 57.44300
   Percentage of sugar = 0.059 per cent dextrose.

Etherized dog for 2 hours, using 250 cc. of ether and at end drew off blood as above.

2. Weight of flask + NaOx + blood = 106.17210 gm.
   Weight of flask + NaOx = 54.52900
   Weight of blood = 51.64310
   Percentage of sugar = 0.141 per cent dextrose.

Increase in sugar of blood due to ether anæsthesia = 0.082 per cent dextrose.

Remarks.—A marked increase in the percentage of sugar in blood.

Experiment No. 6.—Dog, No. B 15. Female. Drew blood from right jugular vein, before beginning anæsthesia.

1. Weight of flask + NaOx + blood = 109.09420 gm.
   Weight of flask + NaOx = 58.21425
   Weight of blood = 50.77995
   Percentage of sugar = 0.031 per cent dextrose.

Etherized dog for 2 hours, using 250 cc. of ether and at end drew off blood as above.

2. Weight of beaker + NaOx + blood = 107.61190 gm.
   Weight of beaker + NaOx = 58.29200
   Weight of blood = 49.31990
   Percentage of sugar = 0.215 per cent dextrose.

Increase in sugar of blood due to anæsthetic = 0.184 per

Urine was drawn by catheter at end of anæsthesia and

obtained. This strongly reduced Fehling's solution.

Experiment No. 7.—Dog, No. B 15. Female. Blood take

left jugular vein before beginning anæsthesia.

1. Weight of flask + NaOx + blood = 115.22300 gm.
   Weight of flask + NaOx = 62.49020
   Weight of blood = 52.73280
   Percentage of sugar = 0.058 per cent.

Etherized dog for 2 hours, using 250 cc. of ether, and

drew off blood as above.

2. Weight of flask + NaOx + blood = 110.96920 gm.
   Weight of flask + NaOx = 58.13490
   Weight of blood = 52.83430
   Percentage of sugar = 0.113 per cent.

Increase in sugar in blood due to anæsthetic = 0.055 per

Experiment No. 8.—Dog, No. B 63. Female. Blood taken

right jugular vein before beginning anæsthesia.

1. Weight of flask + NaOx + blood = 83.47240 gm.
   Weight of flask + NaOx = 31.34960
   Weight of blood = 52.12280
   Percentage of sugar = 0.041 per cent dextrose.

Etherized dog for 2 hours, using 250 cc. of ether, and the

blood from vein as above.

2. Weight of flask + NaOx + blood = 93.61430 gm.
   Weight of flask + NaOx = 40.85850
   Weight of blood = 52.75580
   Percentage of sugar = 0.159 per cent.

Increase in sugar in blood due to anæsthetic = 0.118 per

The urine was collected for 24 hours. Amount, 230 cc.

no albumin. Sugar, 2.5596 gm.

Experiment No. 9.—Dog, No. B 65. Female. Blood taken

right jugular vein before beginning anæsthesia.

1. Weight of flask + NaOx + blood = 87.82200 gm.
   Weight of flask + NaOx = 35.63600
   Weight of blood = 52.18600
   Percentage of sugar = 0.055 per cent dextrose.

Etherized dog for 2 hours, using 250 cc. of ether, and the

blood from vein as above.

2. Weight of flask + NaOx + blood = 87.29390 gm.
   Weight of flask + NaOx = 36.79590
   Weight of blood = 50.49800
   Percentage of sugar = 0.111 per cent dextrose.

Increase in sugar in blood, due to anæsthetic = 0.056 per

Urine collected for 24 hours. Amount, 480 cc., no

Sugar, 1.0745 gm.

vein, before beginning of experiment.

gm.
Weight of flask + NaOx + blood = 88.22560
Weight of flask + NaOx = 38.36390

Weight of blood = 49.86170

Percentage of sugar in blood = 0.045 per cent dextrose.

g etherized for 2 hours, using 250 cc. of ether, and then blood n from vein as above.

gm.
Weight of flask + NaOx + blood = 86.76400
Weight of flask + NaOx = 36.78050

Weight of blood = 49.98350

Percentage of sugar in blood = 0.094 per cent dextrose.

rease in sugar in blood due to anæsthetic = 0.040 per cent ose. The urine showed a positive reduction to Fehling's

ese experiments demonstrate conclusively that in healthy following the administration of ether to the point of deep thesia there occurs an increase of sugar in the blood, then passes into the urine and causes the appearance of ucing body in that fluid. In no case did sugar appear in rine, unless the percentage of sugar in the blood was normal.

ese results are collected into tabular form for their more interpretation.

TABLE No. 1.

Gender.	Diet.	Anæsthesia.	Length of anæsthesia.	Percentage of sugar in blood before anæsthesia.	Percentage of sugar in blood after anæsthesia.	Percentage of increase in sugar in blood.	Sugar in urine.
Female.	200 gm. of lean meat daily.	Ether (250 cc).	2 hrs.	0.059%	0.141%	0.082%	+
Female.	200 gm. of lean meat daily.	Ether (250 cc).	2 hrs.	0.031%	0.215%	0.184%	+
Female.	200 gm. of lean meat daily.	Ether (250 cc).	2 hrs.	0.058%	0.113%	0.055%	+
Female.	200 gm. of lean meat daily.	Ether (250 cc).	2 hrs.	0.041%	0.159%	0.118%	+ 2.560 gm. dextrose.
Female.	200 gm. of lean meat daily.	Ether (250 cc).	2 hrs.	0.055%	0.111%	0.056%	+ 1.075 gm. dextrose.
emale.	200 gm. of lean meat daily.	Ether (250 cc).	2 hrs.	0.045%	0.094%	0.049%	+

g (9) was of the opinion that the extent of the gly- depended upon the amount of the anæsthetic used, t the longer the anæsthesia was continued the greater the percentage of sugar in the urine.

this point, and the results are given below:

Experiment No. 11.—Dog, No. B 61. Blood was taken from the right jugular vein before beginning anæsthesia.

1.
gm.
Weight of flask + NaOx + blood = 87.47120
Weight of flask + NaOx = 36.74400

Weight of blood = 50.72720

Percentage of sugar in blood = 0.034 per cent dextrose.

Dog etherized for 30 minutes, using 25 cc. of ether. Animal was just under the influence of the anæsthetic. Blood was taken at end of anæsthesia from right jugular vein.

2.
gm.
Weight of flask + NaOx + blood = 93.215900
Weight of flask + NaOx = 39.448900

Weight of blood = 53.767000

Percentage of sugar in blood = 0.087 per cent dextrose.

The increase in sugar in the blood, due to the anæsthetic = 0.053 per cent dextrose. Urine, 150 cc. No reducing bodies.

The same experiment was repeated.

Experiment No. 12.—Dog, No. B 61. Female. Animal was bled from right jugular vein before beginning of anæsthesia.

1.
gm.
Weight of flask + NaOx + blood = 119.27020
Weight of flask + NaOx = 70.05150

Weight of blood = 49.21870

Percentage of sugar in blood = 0.046 per cent dextrose.

Dog was then etherized for 30 minutes with 25 cc. of ether. At end of anæsthesia, animal was bled from right jugular vein as above.

2.
gm.
Weight of flask + NaOx + blood = 111.08180
Weight of flask + NaOx = 60.47790

Weight of blood = 50.60390

Percentage of sugar in blood = 0.076 per cent dextrose.

Increase in sugar in blood, due to anæsthetic = 0.030 per cent. Urine collected for 24 hours. Amount 280 cc. Acid, albumin none, sugar none.

A second experiment was performed on the same dog, using 100 cc. of ether.

Experiment No. 13.—Blood taken before anæsthesia from right jugular vein.

1.
gm.
Weight of flask + NaOx + blood = 90.20300
Weight of flask + NaOx = 41.23510

Weight of blood = 48.96790

Percentage of sugar in blood = 0.043 per cent dextrose.

Dog etherized for ½ hour, using 100 cc. of ether. Dog was deeply under. Blood taken at end of anæsthesia from right jugular vein as above.

2.
gm.
Weight of flask + NaOx + blood = 85.19860
Weight of flask + NaOx = 39.77230

Weight of blood = 45.42630

Percentage of sugar in blood = 0.089 per cent.

Increase in sugar of blood, due to anæsthetic = 0.046 per cent dextrose. Urine collected for 24 hours, 610 cc. Albumin, 0; sugar, +. (Trace by Fehling's test.)

The results of all these experiments show that the extent of the hyperglycæmia is more or less dependent upon the amount of the anæsthetic used and the length of the anæsthesia.

TABLE No. 2.

Dog.	Gender.	Diet.	Anæsthesia.	Amount of ether used.	Time of anæsthesia.	Increase in sugar in blood.	Sugar in urine.
B 61	Female.	200 gm. of lean meat daily.	Ether.	25 cc.	30 min.	0.053%	Negative.
B 61	Female.	200 gm. of lean meat daily.	Ether.	25 cc.	30 min.	0.030%	Negative.
B 61	Female.	200 gm. of lean meat daily.	Ether.	100 cc.	30 min.	0.043%	+
B 15	Female.	200 gm. of lean meat daily.	Ether.	250 cc.	2 hrs.	0.184%	+
B 63	Female.	200 gm. of lean meat daily.	Ether.	250 cc.	2 hrs.	0.118%	+

The occurrence of a hyperglycæmia naturally suggests that we turn our attention to the liver as the most probable organ for its source. What effect does ether have upon the glycogen content of this organ? Seelig (10) reports that the percentage of glycogen in the liver is diminished after etherization. Another method of investigating the question appealed to us: What would be the effect of removal of the liver from the circulation, upon the occurrence of ether glycosuria? This condition could be brought about by establishing an Eck fistula; then, after the animal had recovered from the effects of the operation, the study could be carried out in the same manner as outlined in the previous experiment. The results should indicate conclusively to what extent the liver entered into the mechanism of ether glycosuria.

The experiments are given below. All the animals were upon the same diet, namely, 200 gm. of lean meat daily.

EXPERIMENT No. 14.—Dog, No. B 36. Female. An Eck fistula was made for us by Drs. Bernheim and Stone. The animal made an excellent, immediate recovery and was allowed to recuperate for one week. During this period, the dog was given a liberal amount of bones and water with the regulation 200 gm. of meat. Then she was operated upon aseptically and 50 cc. of blood withdrawn from the right jugular vein before beginning of the anæsthesia.

1. Weight of flask + NaOx + blood = 94.24300 gm.
Weight of flask + NaOx = 44.40810

Weight of blood = 49.83490

Percentage of sugar in blood = 0.055 per cent dextrose.

Dog was then etherized for 2 hours, using 250 cc. of ether, and then blood was taken from right jugular vein.

2. Weight of flask + NaOx + blood = 121.50790 gm.
Weight of flask + NaOx = 66.85840

Weight of blood = 54.64950

Percentage of sugar in blood = 0.0779 per cent dextrose.

Increase in sugar in blood = 0.022 per cent dextrose. anæsthetic. No sugar in the urine.

Remarks.—The increase is very much less than when th is in the circulation.

EXPERIMENT No. 15.—Same dog was used again after a rest. No. B 36. Female. Blood taken from right jugu before beginning anæsthesia.

1. Weight of flask + NaOx + blood = 108.9139 gm.
Weight of flask + NaOx = 61.19210

Weight of blood = 47.7218

Percentage of sugar in blood = 0.064 per cent dextr

Animal was etherized for 2 hours, using 250 cc. of eth then bled from right jugular vein.

2. Weight of flask + NaOx + blood = 120.329 gm.
Weight of flask + NaOx = 66.898

Weight of blood = 53.431

Percentage of sugar in blood = 0.089 per cent dextr

Increase in sugar in blood due to anæsthetic = 0.025 dextrose. No sugar in the urine.

Remarks.—Here again the increase in sugar in blo anæsthesia is strikingly less than when the liver is in th circulation.

The dog was turned over to Dr. Whipple for further ments, at the conclusion of which the animal was killed splendid Eck fistula was found to have exsited.

A third experiment was conducted to further confir results.

EXPERIMENT No. 17.—Dog, No. B 48. Female. We pounds. An Eck fistula was established upon this animal Bernheim and Stone. The animal recovered well, and was post-operatively exactly as in the previous experiment. Blo taken from right jugular vein before beginning of anæsth

1. Weight of flask + NaOx + blood = 89.623 gm.
Weight of flask + NaOx = 39.434

Weight of blood = 50.1884

Percentage of sugar in blood = 0.066 per cent dextr

Dog was then etherized for 2 hours, using 250 cc. of eth then bled from the right jugular vein.

2. Weight of flask + NaOx + blood = 86.955 gm.
Weight of flask + NaOx = 39.973

Weight of blood = 46.9818

Percentage of sugar in blood = 0.093 per cent dextr

Increase in sugar in blood, due to anæsthetic = 0.02 dextrose. No sugar in the urine.

A fourth experiment confirmed the preceding ones.

EXPERIMENT No. 18.—Dog, No. B 48. Female. Dog left jugular vein, before beginning of anæsthesia.

1. Weight of flask + NaOx + blood = 95.68 gm.
Weight of flask + NaOx = 46.64

Weight of blood = 49.04

Percentage of sugar in blood = 0.059 per cent dex

Dog given ether for 2 hours, using 250 cc., and then left jugular vein at end of anæsthesia.

Weight of flask + NaOx = 39.42550

Weight of blood = 32.65280

ercentage of sugar in blood = 0.050 per cent dextrose.

arks.—Here there is no increase in sugar in blood after but a slight decrease *i. e.* 0.009 per cent dextrose.

se experiments suffice to show what part the liver takes mechanism of ether glycosuria. When the liver is re- from the circulation and consequently from the effect anæsthetic, there occurs practically no change in the tage of sugar in the blood. This, taken in conjunction eelig's findings of a diminished glycogen content of the ollowing ether anæsthesia, establishes the liver as the furnishing the increased sugar to the blood. Of course irculation reaches the liver through the hepatic arteries, is may account for the very slight change in the per- e of the blood-sugar, but other experiments in which patic artery was tied and cut indicate that the influence hepatic artery is very slight.

ıble of the results of these experiments is given below.

TABLE No. 3.

ECK FISTULA DOGS.

Gender.	Diet.	Anæsthesia.	Length of anæsthesia.	Percentage of sugar in blood before anæsthesia.	Percentage of sugar in blood after anæsthesia.	Percentage of increase in sugar in blood.	Sugar in urine.
Female.	200 gm. of lean meat daily.	Ether (250 cc).	2 hrs.	0.055%	0.077%	0.022%	–
Female.	200 gm. of lean meat daily.	Ether (250 cc).	2 hrs.	0.064%	0.089%	0.025%	–
Female.	200 gm. of lean meat daily.	Ether (250 cc).	2 hrs.	0.066%	0.093%	0.027%	–
Female.	200 gm. of lean meat daily.	Ether (250 cc).	2 hrs.	0.059%	0.050%	0.009%	–

gard to the causes which induce the liver, under the in- of ether, to raise the sugar content of the blood, the re is in much disagreement.

(10) thinks that in an allied condition of asphyxia ria, the cause lies in the presence of an excess of carbon- in the blood and tissues and not a poverty of oxygen.

od (11) states that in asphyxia glycosuria, if the nic fibers to the liver are severed, no glycosuria results. has demonstrated the presence of glycogenetic fibers ver in the splanchnics.

and Roof (12) suggest that anæsthetics possess the combining with tissue protein, and in this way limit- activity of the bioplasm, and its power of combining ies for the purpose of metabolism.

and Bonlud (13) state that glycosuria in asphyxia

of leucomaines which interfere with glycolysis.

Edie (14) further suggests that the anæsthetic attracts the sugar containing substances in the tissues, setting free sugar.

Seelig (15) claims to be able to remove the effects of ether by intravenous infusions of oxygen.

Thus it is evident that the suggestions as to the cause of ether glycosuria can be largely grouped into three categories:

(1) Due to excess of carbon-dioxide.
(2) Due to poverty of oxygen.
(3) Action through the splanchnic.

In regard to the first suggestion, it was generally noted that the blood taken at the end of anæsthesia was quite red and did not suggest a high content of carbon-dioxide.

Further, Seelig did not notice any degree of asphyxia in his animals and does not give much consideration to this explanation.

As regards the administration of oxygen with the ether, we have not been able to prevent the occurrence of a glycosuria by such a procedure.

The control of many functions of glands by nerves is such a well-established process in the body that the possibility of ether acting through the mediation of the splanchnic nerve seemed worthy of study, especially in view of the results of the splendid experiments of Macleod (17), in which he demonstrated the presence of glycogenetic fibers in these nerves.

Accordingly, experiments were undertaken after the following schema:

(1) Dogs were anæsthetized as above, to determine their initial hyperglycæmia.

(2) Then they were operated upon, and the splanchnic fibers going to the liver cut, together with the hepatic artery. It was found that many of the fibers were so intimately associated with this artery that they could not be severed without also cutting the artery.

(3) After the animal had recovered, the effect of ether was again tried.

The results are given in the protocols below.

EXPERIMENT No. 19.—Dog, No. B 63. Female. Diet: 200 gm. lean meat daily. Dog bled from right jugular vein before starting anæsthetic.

gm.
1. Weight of flask + NaOx + blood = 83.47240
Weight of flask + NaOx = 31.34960

Weight of blood = 52.12280
Percentage of sugar in blood = 0.041 per cent dextrose.

Dog was anæsthetized for 2 hours, using 250 cc. ether, and then bled from same vein.

gm.
2. Weight of flask + NaOx + blood = 93.61430
Weight of flask + = 40.85850

Weight of blood = 52.75580
Percentage of sugar in blood = 0.159 per cent dextrose.

Increase in sugar of blood, due to anæsthetic = 0.118 per cent dextrose. The urine was positive to Fehling's test.

The dog was operated upon after a few days' rest, and the splanchnics cut, together with the hepatic artery as described above. After a week's rest, the dog was then subjected to the ether experiment in same manner as before. Blood was drawn from the left jugular vein, before beginning the anæsthesia.

gm.
1. Weight of flask + NaOx + blood = 89.47000
Weight of flask + NaOx = 38.61760

Weight of blood = 50.85240
Percentage of sugar in blood = 0.040 per cent dextrose.

Dog was then anæsthetized for 2 hours, using 250 cc. ether, and bled at end of anæsthesia from left jugular vein.

gm.
2. Weight of flask + NaOx + blood = 92.09410
Weight of flask + NaOx = 41.39570

Weight of blood = 50.69840
Percentage of sugar in blood = 0.144 per cent dextrose.

Increase in sugar in blood, due to anæsthetic = 0.104 per cent dextrose. Urine was positive for Fehling's test.

Remarks.—Cutting the splanchnics had practically no effect on the occurrence of ether glycosuria, as shown by the table.

Per cent dextrose.
Increase in sugar in blood before cutting splanchnics = 0.118
Increase in sugar in blood after cutting splanchnics = 0.104

Another experiment was performed under the same conditions.

EXPERIMENT No. 20.—Dog, No. B 65. Female. Dog was on diet of 200 gm. of lean meat daily. Blood taken from right jugular vein before beginning of anæsthesia.

gm.
1. Weight of flask + NaOx + blood = 87.82200
Weight of flask + NaOx = 35.63600

Weight of blood = 52.18600
Percentage of sugar in blood = 0.055 per cent dextrose.

Dog was then anæsthetized for 2 hours, using 250 cc. of ether, and bled from right jugular vein.

gm.
2. Weight of flask + NaOx + blood = 87.29390
Weight of flask + NaOx = 36.79590

Weight of blood = 50.49800
Percentage of sugar in blood = 0.111 per cent dextrose.

Increase in sugar in blood due to anæsthetic = 0.056 per cent dextrose. Urine showed 1.0745 per cent dextrose.

Animal was allowed to recover for a week and then operated upon and the splanchnics cut, together with the hepatic artery. After a few days' rest the animal was again subjected to the ether experiment as above. Blood was taken from the left jugular vein before beginning of anæsthesia.

gm.
1. Weight of flask + NaOx + blood = 96.54570
Weight of flask + NaOx = 45.73080

Weight of blood = 50.81490
Percentage of sugar in blood = 0.037 per cent dextrose.

Dog was then anæsthetized for 2 hours, with 250 cc. of ether, and at end of anæsthesia blood was drawn off from left juglar vein.

gm.
2. Weight of flask + NaOx + blood = 104.39320
Weight of flask + NaOx = 53.28520

Weight of flask = 51.10800
Percentage of sugar in blood = 0.114 per cent dextrose.

Increase in sugar in blood due to anæsthetic = 0.077 pe dextrose. Urine showed 2.175 gm. dextrose.

Remarks.—The cutting of the splanchnics had no appa influence upon the glycosuria caused by the ether.

Per ce dextr
Increase in sugar in blood before cutting splanchnics = 0.05
Increase in sugar in blood after cutting splanchnics = 0.0

Another experiment was performed under the sa ditions.

EXPERIMENT No. 21.—Dog, No. B 66. Female. Dog on t 200 gm. of lean meat daily. Dog bled from right jugula before beginning anæsthesia.

gm.
1. Weight of flask + NaOx + blood = 88.22560
Weight of flask + NaOx = 38.36390

Weight of blood = 49.86170
Percentage of sugar in blood = 0.045 per cent dextrose.

Dog was then etherized for 2 hours, using 250 cc. of ethe bled from the right jugular vein at end.

gm.
2. Weight of flask + NaOx + blood = 86.76400
Weight of flask + NaOx = 36.78050

Weight of blood = 49.98350
Percentage of sugar in blood = 0.094 per cent dextros

Increase in sugar in blood due to anæsthetic = 0.049 p Urine was positive to Fehling's test.

Dog was then allowed to recover for about a week an operated upon as in previous experiments. After a wee covery, the ether experiment was again repeated. Bloo from right jugular vein, before beginning of anæsthesia.

gm
1. Weight of flask + NaOx + blood = 90.04270
Weight of flask + NaOx = 36.11640

Weight of flask = 53.92630
Percentage of sugar in blood = 0.044 per cent dextr

Dog was then etherized for 2 hours, using 250 cc. of e then bled at end, from left jugular vein.

gm.
2. Weight of flask + NaOx + blood = 93.72710
Weight of flask + NaOx = 43.65580

Weight of blood = 50.07130
Percentage of sugar in blood = 0.166 per cent dextr

Increase in sugar in blood due to anæsthetic = 0.12 dextrose. Urine was positive to Fehling's test.

Remarks.—Here, again, cutting the splanchnic nerve remove the effect of ether causing a hyperglycæmia and gl

A fourth experiment is given in which the ani operated upon and the splanchnics cut without ha determined the extent of the hyperglycæmia with the nics intact. It is given because it adds to the comp the series.

EXPERIMENT No. 22.—Dog, No. B 47. Female. Do daily diet of 200 gm. of lean meat. Splanchnics to live as in previous experiment and after a few days' recover experiment was begun. Animal was bled from the ri vein before beginning of anæsthesia.

Weight of blood = 52.03840

ercentage of sugar in blood = 0.0302 per cent dextrose.

was then anæsthetized for 2 hours, using 250 cc. of ether, led from the left jugular vein at end.

gm.

Weight of flask + NaOx + blood = 86.14350

Weight of flask + NaOx = 35.23920

Weight of blood = 50.90430

ercentage of sugar in blood = 0.143 per cent dextrose.

ease in sugar in blood = 0.0841 per cent dextrose.

arks.—This confirms the preceding experiments. The re- ire put in tabular form for their more ready interpretation.

TABLE No. 4.

SPLANCHNIC NERVE EXPERIMENTS.

Dog.	Gender.	Diet.	Anæsthetic.	Percentage of sugar in blood before.	Percentage of sugar in blood after.	Increase in sugar in blood.	Appearance of sugar in urine.	Amount of sugar in urine.
B 63	Female.	200 gm. of lean meat daily.	Ether.	0.041%	0.159%	0.118%	+	....
B 63	Female.	200 gm. of lean meat daily.	Ether.	0.040%	0.144%	0.104%	+	...
B 65	Female.	200 gm. of lean meat daily.	Ether.	0.055%	0.111%	0.056%	+	1.0745 gm. dextrose.
B 65	Female.	200 gm. of lean meat daily.	Ether.	0.037%	0.114%	0.077%	+	2.175 gm. dextrose.
B 66	Female.	200 gm. of lean meat daily.	Ether.	0.045%	0.094%	0.049%	+	....
B 66	Female.	200 gm. of lean meat daily.	Ether.	0.044%	0.166%	0.122%	+	....

se experiments show clearly that the anæsthetic causes cosuric effect just as well after the splanchnics to the re cut. They further show that with the hepatic artery ed from the circulation the anæsthetic works its full ust as well through the portal circulation. This parallels osely the observations of Whipple and Sperry (17), loroform acts just as well and causes the same lesions liver when the hepatic artery is excluded from the cir- by ligation.

e results would lead us to think that the anæsthetic ectly upon the liver, and in some unknown way stimu- iat organ to increase the sugar content of the blood. ie glycosuric effect of ether practically disappears when r is excluded from the circulation, we must, it seems ble, conclude that the cause of the increased sugar of the blood lies within this organ, and is not due to ct upon the muscle or other organ glycogen, or upon ulating sugar in the blood.

effect can be brought about by the path of the blood since eliminating the liver from the influence of its

Further investigation is necessary to ascertain whether ether affects the activity of the glycolytic ferments.

Conclusions.

(1) Following the administration of ether to the point of deep anæsthesia, there results, in healthy adult dogs, a well-marked glycosuria.

(2) The reducing body in the urine is dextrose.

(3) The cause of the glycosuria is a definite hyperglycæmia.

(4) The liver is the organ which furnishes the increase in sugar to the blood, as shown by the absence of the occurrence of a hyperglycæmia and glycosuria when the liver is removed from the circulation by an Eck fistula.

(5) Severance of all the splanchnic fibres of the cœliac plexus going to the liver did not remove the hyperglycæmia and glycosuria elicited by ether.

NOTE.—During the time of preparation of this article, Hawk has published two communications, dealing with the subject of post-anæsthetic glycosuria. In one (18) he concludes that this type of glycosuria is due primarily to the effect of ether in stimulating the transformation of glycogen into dextrose. The second (19) paper deals more largely with the rate of urine formation under ether anæsthesia. There occurs an inhibition of the urine-forming function during the time anæsthesia is induced, but such inhibition is quickly followed by a stimulated urine flow which is initialed as soon as the period of anæsthesia terminates. The inhibition of the urine formation was probably due to the effect of ether in constricting the arterioles of the kidney's blood supply.

LITERATURE.

1. Ruschhaupt: Archiv für Experimentelle Pathologie und Pharmakologie, 1900, XLIV, 127-141.
2. Seelig: Archiv für Experimentelle Pathologie und Pharmakologie, 1905, LII, 481-494.
3. Hawk: American Journal of Physiology, 1903-1904, X, 37.
4. Macleod: American Journal of Physiology, 1907, XIX, 388-407.
5. Underhill: Journal of Biological Chemistry, 1905-1906, I, 113-130.
6. Seelig: Archiv für Experimentelle Pathologie und Pharmakologie, 1905, LII, 481-494.
7. Oppler-Bertrand: Zeitschrift für physiologische Chemie, 1910, LXIV, 393.
8. Seelig: Archiv für Experimentelle Pathologie und Pharmakologie, 1906, LIV, 206-216.
9. Seelig: Archiv für Experimentelle Pathologie und Pharmakologie, 1905, LII, 481-494.
10. Edie: Biochemical Journal, 1906, I, 455-473.
11. Macleod: Journal of the American Medical Association, 1910, LV, 2133.
12. Mone and Roff: Proceedings of the Royal Society, 1904, LXXIII, 382.
13. Lepine and Bonlud: Comptes rendus de l'Académie des Sciences, 1902, CXXXIV, 582.
14. Edie: Biochemical Journal, 1906, I, 455-473.
15. Seelig: Archiv für Experimentelle Pathologie und Pharmakologie, 1905, LII, 481-494.
16. Macleod: American Journal of Physiology, 1903-1904, X, 37.
17. Whipple and Sperry: Johns Hopkins Hospital Bulletin, 1909, XX, 278.
18. Hawk: Archives of Internal Medicine, 1911, VIII, 39.
19. Do: Idem, 1911, VIII, 174.

THE EFFECT OF OCCLUSION OF THE VARIOUS HEPATIC VESSELS UPON THE LIVER.

By M. C. Winternitz, M. D.,

Associate in Pathology, The Johns Hopkins University.

Although the intrahepatic branches of the hepatic vessels are terminal, their capillary communications are so abundant that, as a rule, embolism or thrombosis of either of them causes no interference with the circulation of the liver. Despite this fact, various pathological changes, varying from simple congestion to true red and white infarcts, characterized by coagulative necrosis in the area supplied by the occluded vessel or vessels, are recognized and have been reproduced experimentally. These will be briefly discussed and a few original cases added.

Occlusion of the Portal Vein.

Occlusion of the portal vein, either thrombotic or embolic, is not rare. This is very evident from Lissauer's report.[1] Among 26,687 cases which came to autopsy at the University of Breslau from 1878-1907, Lissauer found 68 instances of complete or partial thrombotic occlusion of the portal vein or its branches. Most of these occurred as a secondary manifestation in a number of conditions. Portal thrombosis, however, may be primary and is then characterized by a symptom complex of circulatory ileus, as in the case of Lewis and Rosenau.[2] These authors collected 20 other cases from the literature.

As a rule such occlusion has no effect upon the liver parenchyma, since the hepatic artery supplies the blood by the anastomosis between the two systems. That is, while the branches of the portal vein alone supply the acini of the liver with blood and the hepatic artery supplies the interlobular tissue, still the capillaries arising from the hepatic artery empty into the interlobular branches of the portal vein. In this way the hepatic artery, through its anastomosis with the interlobular vein, is capable of compensating when the larger branches of the portal vein are occluded. As long as the small branches of the portal vein are not involved, so long will the hepatic artery be able to nourish the liver parenchyma.

Etiology.—Lissauer concluded, from his analysis of the literature, that slowing of the blood stream is not in itself sufficient to bring about portal thrombosis, that "marantic" thrombi must be exceptionally rare, and that one of the following conditions is essential:

Primary authoctonus atheroma.
Inflammation of the vein wall by extension.
Compression of the vein.
Purulent pylephlebitis.

Lewis and Rosenau, however, conclude from their clinical and experimental studies that bacterial infection plays a very important rôle in portal thrombosis. This is in agreement with the findings of other authors—Welch,[3] etc., in
bosis elsewhere.

Obliteration of the Portal Vein Without He
Changes.

This subject has been reviewed very recently by M.
He cites, as a typical example of fresh thrombosis
portal vein, a case reported by Saxer in 1902, where
occluded all of the portal radicals. Despite this, the
only somewhat small and anemic. The circulation
dently been carried on by the hepatic artery.
quotes a number of cases of old thromboses of the

1. A case of Umber's where the vein was
thrombus judged to be from 20 to 30 years old.
bus was 1 cm. long and just at the hilus of the
liver was relatively small, but otherwise normal.
collateral circulation to the liver was determined.
vein also contained a thrombus and the spleen was
enlarged.

2. A case described by Heller where the thrombus
ing the portal vein had been extensively canalized.
ent had suffered for many years from a very much
spleen which gradually decreased in size. He died of
tured verrucose vein of the stomach. The liver
marked changes.

3. A case reported by Risel showed the formation
merous new veins besides canalization of the thrombus
extended into the hepatic branches. The spleen
enlarged. Death was caused by a fresh clot in the
mesenteric vein.

4. A case of Pick's where death followed
varix of the œsophagus. The portal vein was
Pick considered that the thrombosis had been
a true hemangioma arising in the wall of the portal
extensive collateral circulation had been established

Versé then includes a case of his own where an
thrombus occupied the splenic and the larger branches
portal vein. A tremendous collateral circulation
lished itself to carry off the portal blood. This
through the colic, gastric, œsophageal, omental and
by its communication with the adrenal, veins.
ceived a large amount of portal blood through
cavernous vessels of which the original canalized

---

[1] Lissauer: Virchow's Arch., 1908, CXCII, 278.

[2] Lewis and Rosenau: Arch. Int. Med., 1909, III, 233.

[3] Welch: Tr. Ass. Am. Phys., 1900. XV, 441.

[4] Versé: Beiträge z. path. Anat. u. z. allg. Path., 19
520.

[5] Versé discusses the nature of this hemangioma. He
agree with Pick that this is a true blastoma, but
formation secondary to the thrombosis—as in his case.

mentally the portal vein has been ligated repeatedly production of Eck fistulæ. In several of these cases re- by Whipple[6] the liver, 10 to 11 weeks after ligation portal, showed the following picture: "In one dog tula between the portal vein and vena cava was quite (4 x 6 mm.) and the ligature about the portal vein he fistula was not effective, the opening admitting only nts of the scissors. In the other animal the fistula was arge and the ligature of the portal vein was efficient. e livers were practically the same in both cases. The was small, flabby, and rather tough. The lobules were presenting a brown, translucent edge and minute cen- ellow dot. Microscopically there was considerable y and fatty degeneration of the central half of the liver "

ur autopsy reports the following cases of thrombosis of rtal vein without marked hepatic changes have oc- :[7]

. W., white, age 49 years. Autopsy No. 175.

omical Diagnosis.—Carcinoma of the stomach; metastases astro-hepatic glands; *carcinomatous thrombus of the portal* multiple carcinomata of the liver; ascites; hydrothorax ; emphysema; bronchiectasis; bronchitis; bronchopneu- with fresh pleurisy.

is very large, covered by tumor masses. The hepatic is slightly thickened. The portal vein is of normal size. very entrance into the liver there projects into it a large, carcinoma nodule (4 x 2½ cm.). The veins arising in the of the thrombus are likewise filled with the tumor tissue, arge mass in the left lobe of the liver is directly continu- h the vein thrombus.

re is in this case no note which would indicate any in the hepatic tissue resulting from the portal oc- .

. B., white female, age 59 years. Autopsy No. 214.

mical Diagnosis.—Syphilitic deformity of the liver of ex- degree; chronic passive congestion of spleen with peri- s and perihepatitis; chronic thickening of peritoneum, ly around the liver; *recent portal thrombosis;* fat necrosis ; acute diffuse peritonitis; chronic diffuse nephritis; nsufficiency; hypertrophy of left ventricle; calcification in of splenic vein with parietal thrombus.

ortal vein is very wide, circumference 6½ cm. Just as it the liver its lumen is filled with a fresh grayish-red is adherent in places to the intima, but in general easily . It extends a short distance into the main branches of . and looks very recent in its formation. The vessels in ato-duodenal ligament are enveloped in a mass of dense tissue.

from a marked syphilitic cirrhosis, no lesion was the liver. Here again the portal occlusion was with- t. The etiological factor probably was syphilis.

per lobes; amyloid infiltration, spleen and kidneys; tuberculous ulceration of large and small intestine; *thrombosis of intrahepatic branches of portal vein.*

Liver.—1250 grams. Surface smooth. Margin round. Lobules visible. Consistency rather increased. Portal vein large, 2 cm. in diameter. Hardened sections of liver show slight increase in connective tissue. Thrombi in portal veins with extensive liver-cell emboli in same vessels. Slight dilatation of the capillaries.

4. L. G. Autopsy No. 462. Dr. Flexner.

Anatomical Diagnosis.—Diffuse suppurative cellulitis of left leg (streptococcus); ascites; chronic adhesive peritonitis; chronic perisplenitis; perihepatitis; *thrombosis of the portal vein;* chronic diffuse nephritis with acute exacerbation; chronic pleuritis, etc.

Liver.—1700 grams, 21 x 15 x 9 cm. It is everywhere adherent. The capsule is thickened, white fibrous-looking and in places reaches 4 mm. in thickness. On section it presents a mottled aspect. The surface is in general cloudy, deep reddish brown in color, with many lighter yellowish areas. Heavy bands of connective tissue proceed in from the porta and the capsule. By this means circumscribed areas of liver tissue are completely marked off. In general the lobules are more distinctly isolated than normally, and the central veins are quite prominent. The consistency of the liver is much increased. In the portal vein are thrombi. The main branch, beginning at the junction of the principal abdominal veins, is almost completely filled by a mixed thrombus which is only slightly adherent. At the entrance into the liver the vein is filled with a more firmly adherent, laminated, somewhat softened thrombus which does not fill the lumen. Some of the principal branches of the portal vein in the liver contain thrombus masses, some of which are recent, scarcely adherent and continuous with the laminated thrombus.

Microscopically there is an increase in connective tissue plus fatty degeneration of the liver cells.

It is quite probable that the mottled appearance of the liver in this case is related to the portal occlusion. The coarse bands of fibrous tissue also suggest a syphilitic cirrhosis.

5. B. S., white female, age 51 years. Autopsy No. 483.

Anatomical Diagnosis.—Carcinoma of the head of the pancreas with extension into the duodenum and stomach; multiple metastases to lymph glands, both adrenals, liver and lung; *thrombosis of portal vein.*

The portal vein is thrombosed just before it enters the liver by a partially decolorized thrombus mass. Aside from the tumor metastases, section of the liver is brownish red in color and homogeneous.

6. L. F., white male, age 45 years. Autopsy No. 567.

Anatomical Diagnosis.—Perforating ulcer of stomach; old adhesive peritonitis around perforation; ulceration into splenic artery and into small pyloric artery; thrombosis of splenic artery; extension of clot into cœliac axis and abdominal aorta; infarction of spleen; *complete thrombosis of splenic vein, with extension of thrombus into portal vein;* thrombosis of many interlobular veins in liver, etc.

Liver is rather small (22½ x 16 x 5 cm.). Surface smooth. Left lobe is adherent to the stomach. On section organ is soft and flabby, but tough. In the right lobe the lobulation is marked. The general color is brownish red. The left lobe is homogeneous in color. The lobules are scarcely visible. In a number, but not in all, of the interlobular veins of the right lobe, there are antemortem clots, reddish and sometimes with white centers. These are continuous with a small thrombus in the portal vein. There are very few thrombi in the interlobular veins

---

ple and Sperry: Johns Hopkins Hosp. Bull., 1909, XX,

protocols will be abstracted as briefly as possible. Only rts of particular interest to the subject at hand will be of the left lobe, although they occur, and a small thrombus enters the large portal radical of the left lobe.

Here the thrombus occluding the portal vein had no effect upon the liver parenchyma. No doubt the localized peritonitis was the direct cause of the thrombosis.

7. H. S., white male, age 49 years. Autopsy No. 649.

Anatomical Diagnosis.—Diabetes mellitus; cirrhosis of liver; *thrombosis of portal,* splenic and mesenteric veins; hemorrhagic infarction of intestine; acute peritonitis (serofibrinous, due to gas bacillus); subcutaneous œdema and emphysema, etc.

Liver is firmly bound to the diaphragm over the right lobe. Here the capsule is much thickened (4 mm.) and of cartilaginous appearance. Surface of liver is rough and coarsely granular. On section coarse cirrhosis is visible. The cut surface has a yellow color. Portal vein contains a decolorized thrombus firmly adherent to the wall of the vein, and extending beyond the hilum into some of the main branches.

No definite cause for the thrombus formation in the liver was evident in this case. It is probable that portal stasis referable to the cirrhosis was an important factor.

8. C. H. C., white male, age 58 years. Autopsy No. 850. Dr. Flexner.

Anatomical Diagnosis.—Thrombosis of mesenteric veins; necrosis and gangrene of small intestine; general fibrino-purulent peritonitis; abscess in omentum (operation wound); extension of venous thrombus into portal vein; congestion of liver and spleen.

Liver free from adhesions, weight 2500 grams. On section cloudy, markings distinct owing to moderate congestion. Consistency not increased.

Mesenteric vein is thrombosed. The thrombus in the main branch is partly decolorized, dry and adherent to the vein wall, etc. The thrombus can be traced into the portal and extends into the hilum of the liver. The main branch of the portal vein is apparently completely occluded by the firm, grayish-red mass which is moderately adherent to the vein wall. Beyond the main vein and extending into the left branch, but not into the right, is a recent soft red clot.

Here the occluding mass was a propagative thrombus from the mesenteric vein.

9. Outside Case. Autopsy No. 1398. Dr. MacCallum.

Anatomical Diagnosis.—Primary splenomegaly; *thrombosis of splenic mesenteric and portal veins;* splenic and intestinal infarcts; post mortem gas bacillus invasion.

The *liver* is bound to the diaphragm and surrounding viscera by fibrous adhesions. The portal veins on section are everywhere totally or partly occluded by thrombus masses which are fairly adherent to the vein wall. The liver tissue is much distintegrated by gas formation. The splenic vein is dilated to a diameter of 5 cm. and is distended with an elastic chicken-fat clot which shows points of opacity. This clot can be traced into the portal radicals. It completely occludes the portal vein throughout its length. As the clot approaches the liver it becomes darker. On section it is almost diffluent, especially in the more central part, where it has a purplish-brown color. On the lesser curvature and serous surface of the stomach there are several distended veins which are completely occluded by thrombi, as are also the omental veins.

Microscopically the clot in the mesenteric vein is organized and partly canalized. Surrounding the vein is a sheath of very vascular tissue.

The liver shows microscopically no definite increase in connective tissue. The spleen has a thickened capsule, but the trabeculæ are not much thickened and the connective tis the sinuses is much increased.

10. F. S., white male, age 62 years. Autopsy No. 14 Marshall.

Anatomical Diagnosis.—Carcinoma of stomach with meta to liver, etc.; *occlusion of portal vein at hilum of liver by tases; propagated thrombus in hepatic branches of portal*

Liver weighs 1300 grams, measures 26 x 15 x 6½ cm. Co ency decreased. Surface uneven, due to tumor nodules, e section liver substance is pale, rather opaque and fatty. A nodule is found completely blocking the splenic vein, about from junction of splenic and portal veins. The metastasis e into the portal, completely occluding it beyond the hilum liver. It is firmly attached to the vessel wall, giving it a dia of 1 to 3 cm. Where this growth ends beyond the hilum liver a thrombus begins, extending into the main branches portal vein.

11. J. M., white male, age 48 years. Autopsy No. 27 Whipple.

Clinical Diagnosis.—Primitive splenomegaly.

Anatomical Diagnosis.—Chronic splenic tumor; sclerosis splenic and portal veins; cirrhosis of liver and *thrombo portal branches;* chronic passive congestion of pancreas a testine; œsophageal varices with rupture; hemorrhage in stomach and intestine; anemia; chronic fibroid pulmonary culosis; chronic tuberculous lymphadenitis; miliary tub in spleen and liver.

Spleen weighs 1050 grams; measures 21 x 14 x 6½ cm. S vein shows definite sclerosis everywhere, especially marke one leaves the hilum of the spleen. At the junction of the spl vein with the mesenteric vein a large thrombus mass is tightly adherent to the anterior wall of the mesenteric vein only partly occluding its lumen. Thrombus is of a gray showing definite ridges and furrows on its surface. The p vein, however, is completely occluded by a firm thrombus which shows some fresh central blood clot, but is mostly ma of gray translucent tissue. As one goes upward, one find two branches of the portal vein completely obliterated by simi appearing thrombus masses. These thrombi show fibrous t lucent tissue at the margin, merging into the vessel wall, the central portions show a greater or lesser degree of brow red blood clot, or even fluid blood. Some of these vessels to show small channels full of fluid blood, in the organized thrombus mass.

Liver weighs 1200 grams; measures 22 x 16 x 7 cm. Its surface, as a rule, is pretty smooth and of a pale brown Near its anterior margins it shows considerable granulati its surface, prominent nodules of opaque tissue alternating depressed areas in which are dilated blood vessels. The surface of the liver has a more marked granular appea especially around the fissure at the entrance of the portal tures. Cut surface in the upper portion shows great anemia little increase in connective tissue. As one approaches the verse fissure, however, the connective tissue becomes conside in amount; embedded in it are irregular nodules of opaque appearance, apparently hypertrophied islands of liver tissue. connective tissue increase seems localized pretty sharply a the branches of the portal vein and becomes progressively g in amount as we approach the larger thrombosed branches portal vein.

The *œsophagus*, opened up from behind, shows tremendou tention of the veins underneath its mucosa. These veins ar tortuous; some of them, dilated to a diameter of 3 mm., form miliary saccular aneurysms which bulge very definitely fro walls of the dilated venules. Some show superficial necro the mucosa covering them and are seemingly just on the po

ge dilated veins, into which a good-sized
›be can be passed with ease. Blood can be squeezed through s opening. The stomach contains 650 cc. of dark jelly-like od clot. Its mucosa is intact everywhere. Just around the 'diac orifice it shows a network of large tortuous dilated veins, ich, however, only persist for a distance of 5 cm. from the ıction with the œsophagus. The duodenum is normal. Dissecn of the dilated veins around the cardiac orifice shows them to nmunicate with branches of the splenic vein given off 3 or 4 . from the origin of the vein at the hilum of the spleen. A few the smaller veins in this position seem to anastomose with the ns along the lesser curvature of the stomach.

The *liver* shows an increase in connective tissue between the ules. This, however, is not uniform, being most marked in tions taken from the region of the transverse fissure. The ınective tissue is sharply confined to the margins of the lobules 1 does not extend into the central portion, except where the ule has undergone complete degeneration. The portal vein ›ws a thrombus made up of old fibrous tissue into which merous capillaries have grown. Some of these have become arged to a considerable size and contain fresh blood. The ducts in this neighborhood show signs of active proliferation.*

The above report of Autopsy No. 2706 has been given in ›ater detail because the findings do not correspond with the nical diagnosis of primitive splenomegaly.

These 11 cases do not present any new features. In all, portal vein and its radicals alone were involved. In all, finest interlobular veins were free. In all, the general culation was maintained to a sufficient extent to prevent y striking changes in the liver directly attributable to the lusion. In 3, the thrombi were the direct result of nor invasion; in 2, they were the result of a localized itonitis (one of these was possibly a syphilitic process); 1, they accompanied a syphilitic liver; in 2, they were ondary to cirrhosis; in 1, they were a direct extension m a thrombosed mesenteric vein; in 1, a secondary process urring in the course of a general tuberculosis, where there amyloidosis; and in 1, the process seemed primary.

t is interesting to compare the findings in the above cases h the much more extensive series of Lissauer. In his es, 6 of the 68 cases of thrombosis of the portal vein were ›ciated with atrophic cirrhosis of the liver; in 7, with hilis of the liver; in 2, with primary carcinoma of the r; in 7, with carcinoma of the stomach, accompanied by astatic growths in the liver; in 2, with secondary carcia of the liver; in 6, with primary carcinoma of the biliary ıages; in 9, with gall-stones and inflammatory lesions of gall-bladder; in 10, with diseases of the pancreas; in 1, suppurative inflammation of the umbilical vein; in 6, diseases of the spleen; in 6, with gangrenous appendicitis; , with carcinoma of the intestine; in 1, with a pelvic ess; and in 1, with no definite cause.[8]

points out that the tremendous enlargement of the spleen, the anemia which so often occurs, and the integrity of the liver may often suggest the clinical picture of Banti's disease. Very great enlargement of the spleen may result from simple vascular changes accompanying portal thrombosis; and he concludes that only then may we speak of a primary splenomegaly, when absolutely every other organic cause has been excluded. The above cases are not instances of primary splenomegaly, since the extensive thrombosis is quite enough to explain the findings.

It is essential to remember portal thrombosis in the differential diagnosis of splenomegaly.

EMBOLIC OR THROMBOTIC AREAS OF CONGESTION.

Despite the extensive anastomosis between the branches of the portal vein and the hepatic artery, in rare instances and under accessory circumstances a condition somewhat resembling the macroscopic picture of hemorrhagic infarction, and often spoken of as the "atrophic red infarct of Zahn," may follow plugging of branches of the portal vein. The "atrophic red infarcts of Zahn" are triangular, rectangular or irregularly wedge-shaped areas with their apices at the occluded vessel. As a rule they are dark red or reddish-brown, but pale areas have also been observed. Microscopically there is simply a congestion of the intralobular capillaries with slight atrophy of the liver cells and possibly some pigmentation. It is of importance to note that necrosis does not occur in these areas. Ruczynski[9] explains their production in the following way. The blood from the portal vein no longer flows into the hepatic vein and the latter is only poorly filled by the blood of the hepatic artery. As a result there is a stasis in the hepatic vein due to the deficient *vis a tergo,* and the picture of a congested liver with dilatation of the central veins and capillaries and atrophy of the liver columns is gradually produced. This is the condition which was described by Zahn.[10] Orth[11] had described it previously and in his text-book expresses clearly that they are the result of an aseptic embolic or thrombotic process. He calls them areas of circumscribed congestion, atrophy or cyanotic atrophy which may be viewed as a type of hemorrhagic infarction but never as a complete infarct.

Many observers have described this picture. Bertog[12] described two cases in which a "chronic red atrophy" of the liver was the result of decreased portal blood supply from compression of portal roots by chronic peritonitis. He considered that any hindrance to the free flow of portal blood to the liver might produce an atrophy of the liver similar to what occurs in a liver of congestion. Cohnheim and Litten[13] described a "nutmeg" liver involving the part of the gland

---

There are two other cases of portal thrombosis in our first 3500 psies: one autopsy, No. 224, where there was only a small ›tal thrombus of the portal vein, and autopsy No. 1409, where picture in the liver was so obscured by complicating conditions the result of the portal occlusion upon the hepatic parena was indefinite.

noted by Lewis and Rosenau.

[9] Ruczynski: Ztschr. f. Heilk., 1905, XXVI, 147.

[10] Zahn: Verhandl. d. Gesellsch. deutsch. Naturf. u. Aerzte 1897. Leipz. 1898, Part 2, p. 9; or Centralbl. f. allg. Path., 1897, VIII, p. 860.

[11] Orth: Lehrbuch der Path. Anatomie, 1887, I, 917.

[12] Bertog: Greifswalder Beiträge, 1863. Quoted by Chiari.

[13] Cohnheim and Litten: Virchow's Archiv., 1876, LXVII, 153.

supplied by an occluded portal radical. Klebs[14] cited the presence of wedge-shaped areas after occlusion of radicals of the portal vein; these areas showed microscopically only a granular degeneration. Wagner[15] described an instance of narrowing and thrombosis of several portal radicals resulting in deep red or pale wedge-shaped areas. Köhler[16] reported three cases of cyanotic atrophy after occlusion of large portal radicals. His first case concerned a man who, 7 days before death, underwent an operation, *i. e.,* excision of rectum for carcinoma. At autopsy one of the portal veins contained an antemortem clot and the liver supplied by the branch showed the usual picture macroscopically. Sections showed less fat in the atrophied cells and an increase of brown pigment. The second case was one of malignant tumor of the peritoneum with thrombosis of a portal radical and the usual picture of pseudo infarction. In the third case there was a septic embolus in the right branch of the portal vein, and a large hyperemic wedge-shaped area of liver containing multiple small abscesses corresponded to the distribution of the occluded vein. The thrombus arose in the splenic vein. Köhler concluded that not only portal thrombosis, but also weakened heart action was essential to obtain the above picture of congestion. He considered the atrophy of the liver cells to result from pressure of the dilated capillaries and inactivity of the liver cells. Pitt[17] added three more cases. The first concerned an individual who died 5 days after an operation for relief of an incarcerated scrotal hernia. The liver showed an atrophic zone 2 inches in diameter and the corresponding vein was occluded. Sections only showed dilatation of the capillaries. His second case, an old man who died of cerebral hemorrhage, showed corresponding to many thrombosed branches of the portal vein, numerous sharply demarcated pale or dark areas with dilatation of the capillaries in the latter. In the third case there was a pale area of liver, the result of embolic plugging of a portal branch following operation for ovariotomy. Ruczynski[18] explained the pale areas of the third and second cases by the persistence of anemia following the portal occlusion. Chiari[19] in a very comprehensive report published in 1898 collected most of the above cases and added 17 cases observed by him from 1877 to 1898. On account of the large number of personal observations he is inclined to consider this condition not at all uncommon. Of his 17 cases, 15 resulted from emboli arising in branches of the portal vein. These he subdivided into those cases where the thrombosis of the portal roots followed by hepatic emboli occurred without any external influence (7 cases) and those where some operative procedure involving the portal roots occurred shortly before death—(8 cases). The two remaining cases resulted from thrombi arising within the intra-hepatic radicals of the portal vein.

Of the group of emboli occurring without external cause, 4 were carcinomatous in nature, 1 occurred in a case of mus," 1 in typhoid ulcerative enteritis and 1 from a thrombus formed in the splenic vein, the pressure from an aneurysm of the splenic artery. In cases of the second group the thrombi in the roots of the vein were the direct result of ligatures applied branches at the time of operation.

Chiari considered the dark areas of the liver to be a mechanical result following occlusion of the large bran the portal vein, namely, local areas of congestion in primarily the central vein and the neighboring capillar the central portion of the lobule with atrophy of the live The smallest branches of the portal vein in the affecte of the liver were free of obstruction. Similarly the veins and the hepatic arteries in these areas were unin Blood extravasation only occurred twice and then small amounts. Necrosis of the liver cells was never Chiari's findings confirmed the observations of other concerning the origin of these areas, *i. e.,* that they we circumscribed areas of congestion. The liver cells enough fresh blood through the inner portal roots to The *vis a tergo,* however, was not sufficient to keep normal circulation, and as a result there was a reflu gestion of the blood from the right auricle which, with the constantly decreasing nourishment of the liver caused them to atrophy. It was worthy of note tha number of cases the liver cells of the affected zone, we tically fat free, while in the remaining liver the present in considerable amounts. This Chiari explai the stoppage of the flow of the portal blood through th Finally Chiari concluded with Köhler that simple oc of branches of the portal vein was not sufficient to bring the formation of the so-called atrophic red infarct. T must be added to the occlusion one of the following con

a. Weakening of the arterial current to the liver.

b. Venous congestion.

c. A combination of the two above conditions, or

d. Impaired cardiac action.

This latter he considered to be the most important.

Ruczynski adds several more cases.

That of Lazarus Barlow, concerned a young man, wh been crushed between the buffers of two railroad cars. I followed in three days. At autopsy there was a larg in the right lobe of the liver. In the center of this a thrombosed portal vein and corresponding to the distr of this vessel was a large wedge or grayish-white Lazarus Barlow considered this an anemic infarct. but zynski disagreed with this diagnosis since the author mention in his microscopical findings the presence of liver cells.

Longcope reports a case where, besides numerous meta cancer nodules from a primary gastric growth, there deep red triangular area whose base measured 3 cm. portal vein leading to this discolored zone was occlu

Finally, Versé[20] reports a case where in a young

---

[14] Klebs: Handbuch der Path. Anatomie, 1896, I.

[15] Wagner: Arch. f. klin. Med., 1884, XXXIV, 520.

[16] Köhler: Arb. a. d. path. Institut in Göttingen, 1893, 121.

[17] Pitt: Tr. Path. Soc. Lond., 1895, XLVI, 74.

[18] Ruczynski: *Loc. cit.*

[19] Chiari: Ztschr. f. Heilk. 1898, XIX, 475.

[20] Versé: Verhandl. d. deutsch. path. Gesellsch., 1909, XIII

studied the effect of injection of sterile mercury
the mesenteric veins of dogs. After eight days, the
test period, there were red, triangular areas in the liver
h were typical of the atrophic red infarct in 35 days.
showed microscopically the picture of congestion and
phy of the hepatic parenchyma, but there was no necrosis.
ne following three cases belong to this group of liver
ges following occlusion of the portal vein radicals.
ne first case is so unique that a rather detailed account
be given.

K., white male, age 40 years. Admitted to the medical clinic
e Johns Hopkins Hospital, January 5, 1911, complaining of
ach trouble. Previous to present illness, history was nega-
P. I. began 5 months before admission, with sudden, acute
minal pain and vomiting. This was first blackish and gradu-
became paler. The vomiting persisted and there was loss of
ht, amounting to 100 pounds. Examination revealed nothing
portance except a HCl deficit of 10, and a total acidity of 8;
n increased resistance in left epigastrium. The Wassermann
ion was negative. Occult blood was repeatedly demonstrated
e stools. On March 20, an exploratory laparotomy was per-
ed by Dr. Finney. The stomach was found greatly dilated.
alls were atonic, but there was no evidence of new growth.
e duodenum was greatly enlarged and relaxed, being almost
its normal diameter, with soft, flabby walls. Aside from
dense adhesions, some of which were severed, nothing of
rtance was observed. The patient did not recover from the
ation.
ed, 8 p. m., March 21, 1911.
topsy, 10 p. m., March 21, 1911. Autopsy No. 3519. Dr. Win-
tz.
atomical Diagnosis.—Chronic inflammatory stricture of the
um, probably following strangulation of the bowel after a
lus; multiple thrombi in the mesenteric vessels; dilatation
omach and duodenum; extensive scarring and atrophy of
of jejunum; chronic adhesive peritonitis, particularly marked
the region of the stricture; chronic mesenteric lymphadeni-
ressure of inflammatory mass on retroperitoneal tissues, re-
g in thrombosis of left renal vein; slight atrophy of left
y; (exploratory laparotomy); dislodgment of portion of
bus in renal vein; embolus into one of the smaller radicals
e pulmonary artery with hemorrhagic infarction of lung.
dgement of mesenteric thrombus; embolism into large right
l vein with formation of a localized area of congestion in the

lominal cavity. The adhesions are chiefly in the left hypo-
rium. The omentum is bound tightly to the pancreas and
ith the duodenum and spleen forms one compact mass, over
the jejunum passes emerging from a small knot of adhesion.
er measures 28 x 20 x 9½ cm. Its surface is smooth. On
n it presents an extremely striking picture. A large area in
ght lobe has a much deeper brown color than the remaining
tissue. This area is irregularly wedge-shaped extending to
lus of the gland where the apex of the triangle is found.
ghout this darker portion of the liver the portal vein
ls are occluded by large ante mortem clots which are quite
. These converge to one large hilic branch of the portal
here a large non-adherent clot is found. The two areas of
namely, the darker area in which the portal vessels are
ed and the surrounding paler brown areas present other-
nly minor differences. In both zones the lobules are dis-
In the darker portion they are somewhat smaller.

thinner, the vessels slightly dilated. The change is so slight that it might not be noted were one's attention not specially directed towards it. Neither the interlobular veins, hepatic arteries nor the central veins are involved by thrombus.

This case represents a typical example of the result of embolism of a large portal radical. The embolus arose from a thrombus in the mesenteric vein which was probably dislodged at the time of operation. The area of pseudo infarction in the liver is consequently very young, probably less than 24 hours.

13. R. F., white male, age 40 years. Autopsy No. 1691. Dr. Opie.

Anatomical Diagnosis.—Cholelithiasis; calculus impacted in diverticulum of Vater only partly filling it and occluding its duodenal orifice; acute hemorrhagic pancreatitis; disseminated abdominal fat necrosis; partial thrombosis of splenic vein; *embolism and thrombosis of portal vein.*

Liver weighs 1350 grams. Surface is smooth. Upon the upper surface of the right lobe are three irregular, very slightly depressed areas conspicuous from the fact that they are of a dull red color while the remainder of the surface is yellowish. The cut surface has a bright yellow color. The periphery of the lobules are golden yellow, the central part reddish, corresponding to the areas mentioned on the surface, on section; the tissue below has a similar appearance, the corresponding area being narrower as the surface becomes distant (*i. e.* irregularly wedge-shaped). Here this tissue is of a dull red color. Within such areas are seen sections of veins plugged, and distended with red thrombus. These are found to be portal veins. The vein in one of these areas has a diameter of about 4 mm. It is plugged with a red thrombus, which stops abruptly at the apex of the wedge, where it ends in a yellowish-white embolus. In addition to these large areas mentioned, several distinctly wedge-shaped smaller ones are present. The large portal branches are normal.

Microscopically. Within the lobules, usually at a distance from the portal spaces, are areas where the liver cells are clear and unstained with eosin in contrast to those about. With the high power the protoplasm is entirely unstained, but is slightly granular. The cell body is somewhat swollen. The nucleus is smaller, somewhat irregular, and no longer vesicular, staining homogeneously. In the center of one of these areas, a group of 10 to 12 cells whose protoplasm takes a conspicuous deep eosin stain is found. The nuclei are preserved; many polymorphonuclear leucocytes occur between these cells. (This case was reported by Opie in the Johns Hopkins Hospital Bulletin, 1901, under the title, "The Etiology of Acute Hemorrhagic Pancreatitis").

14. B. V., 1908-9, D. W. Died, February 19, 1908, 2.15 p. m. Autopsy, February 20, 1908, 11.30 a. m. Dr. Meloy.

Anatomical Diagnosis.—Infected ovarian cyst; multiple miliary abscesses (operation); acute and chronic peritonitis; chronic diffuse nephritis (large white kidney); infarct of spleen, *zone of congestion of liver corresponding to distribution of occluded portal vein by thrombus;* amyloidosis; chronic perihepatitis and perisplenitis; anemia; emaciation; polypoid œdematous tumors of bladder.

Unfortunately no other data concerning this case was available. At the time of autopsy, however, the liver was practically identical in appearance with that of Case 12. Microscopically, too, there was no evident change in the organ. It is probable that here also there were thrombi in the portal roots which only reached the intrahepatic branch after operation.

---

an: *Loc. cit.*

To briefly summarize, obstruction of the large branches of the portal vein may cause irregular wedge-shaped areas of congestion, and in rare instances of anemia, in the liver. These are not true infarcts since they show microscopically only a dilatation of the central veins and intralobular capillaries, together with atrophy of the liver cells and no necrosis. Such an area may shrink considerably. This shrinkage is due to atrophy of the liver parenchyma, but to what extent pressure of the dilated capillaries, decreased nutrition, actual necrosis, or inactivity of the cells affects this atrophy is a problem inseparably associated with the still unsettled question of the atrophy of the liver occurring in chronic passive congestion due to general causes.

In all these cases the smallest branches of the portal vein in the congested zones were free of obstruction. The hepatic vein and artery were always unobstructed. The blood reached these zones through the inner portal vein radicals, but not in sufficient quantity to keep up the normal flow. This allowed a reflux from the larger hepatic vein which resulted in congestion. It must be repeated that occlusion of the portal vein alone may not necessarily be followed by congestion in zones supplied by the occluded vein. In order that these results should follow Köhler and Chiari consider that accessory circumstances must exist, such as venous congestion, decreased cardiac activity, etc. The ultimate result of these areas of congestion is not known and the shortest time in any of the cases reported in which the area of congestion occurred following the thrombosis of the portal vein was three days in a case reported by Chiari. In Case 12 the time was less than 24 hours.

TRUE ANEMIC OR HEMORRHAGIC INFARCTS OF THE LIVER RESULTING FROM OCCLUSION OF SMALLEST INTERLOBULAR BRANCHES OF THE PORTAL VEIN.

True infarcts of the liver with necrosis occur as the result of occlusion of the smallest portal vein radicals, namely, the interlobular veins. Under these conditions the blood from the hepatic artery no longer can reach the capillaries of the lobule by its anastomosis with the interlobular veins. There is then a complete mechanical deficiency of the circulation leading often to complete local necrosis of the liver parenchyma which may be combined with hemorrhage.

Cohnheim and Litten[22] emphasized the fact that if the liver parenchyma is to remain free of secondary changes, the interlobular vein must not be involved by the occluding mass. Orth[23] also said that while there may be no effect from occlusion of big branches of the portal vein, if the interlobular branch is involved atrophy as well as necrosis results. To this type of necrosis belong the well-known necrosis of eclampsia as described by Schmorrl, Klebs, Lubarsch, etc. Chiari[24] in his discussion of these infarcts includes cases described by Rattone and Mondino, and Osler. Rattone and Mondino deny the occurrence of inner portal vein radicals, and consider the entrance of the branches of the hepatic artery into the capillaries of the acini of the greatest ance. They describe two cases of infarction. In their case the hepatic artery and portal vein were both occl the affected zone. This was also true in Osler's case. liver was cirrhotic and showed a reddish-brown necro on the surface which extended through the liver tiss triangle. The portal vein leading to this was thromb Osler considered the cirrhosis to have shut off the circulation.

Chiari then adds three cases. The first occurred in of tuberculosis. The liver was the seat of multip tuberculous nodules. There were numerous thrombi mesenteric veins leading from the colon. Micro aside from the tuberculosis there were numerous inter veins plugged by emboli, from the mesenteric thrombi. T were also small areas of coagulative necrosis of the liv which Chiari considered to be infarcts. The case is n vincing.

In his second case following an operation (resection pylorus of the stomach) there were thrombi in the and pancreatic veins. These fed small emboli to the lobular portal branches and multiple small whitish characterized by typical coagulative necrosis resulted.

As an instance of infarction of the liver resulting thrombosis of the interlobular veins he cites a eclampsia.

Ruczynski[25] adds two more cases of this type. case in which necrotic areas occurred in the liver th of small emboli from thrombi in the portal roots and cope's case where there were yellow thrombi in the vein and smallest portal veins causing yellow, necrotic in the parts supplied by the portal vessel.

Versé also describes a case of chronic perityphilitis in the surface of the liver showed numerous pale, brow pressed areas. On section these were dark red, soft and and showed microscopically dilated vessels and necrot cells. The portal vein was occluded by an old thrombus from the hilus, and near the infarct was a canalized thrombus. This case is of further interest since the bosis of the large portal root was without effect, but of the small branches brought about necrosis. The fol case belongs to this group:

15. G. L., colored male, 53 years. Autopsy No. 228.

Anatomical Diagnosis.—Primary carcinoma of stomach ondary in liver, lymph glands and pleura; chronic diffuse neph nodular arteriosclerosis; *thrombosis of minute portal* *softened hemorrhagic infarcts of liver.*

Liver weighs 2600 grams. It is very large and contains ous rather soft, nodular masses which vary considerably ½ to 7 cm. These masses project slightly above the surfa are flat and sometimes very slightly umbilicated. Some nodules are exceedingly soft. On section a large amo bloody fluid escapes. This appears to come from smooth cavities. Some of these cavities are situated directly in the tissue while others are surrounded by a small amount tissue of the tumor. These spaces sometimes form

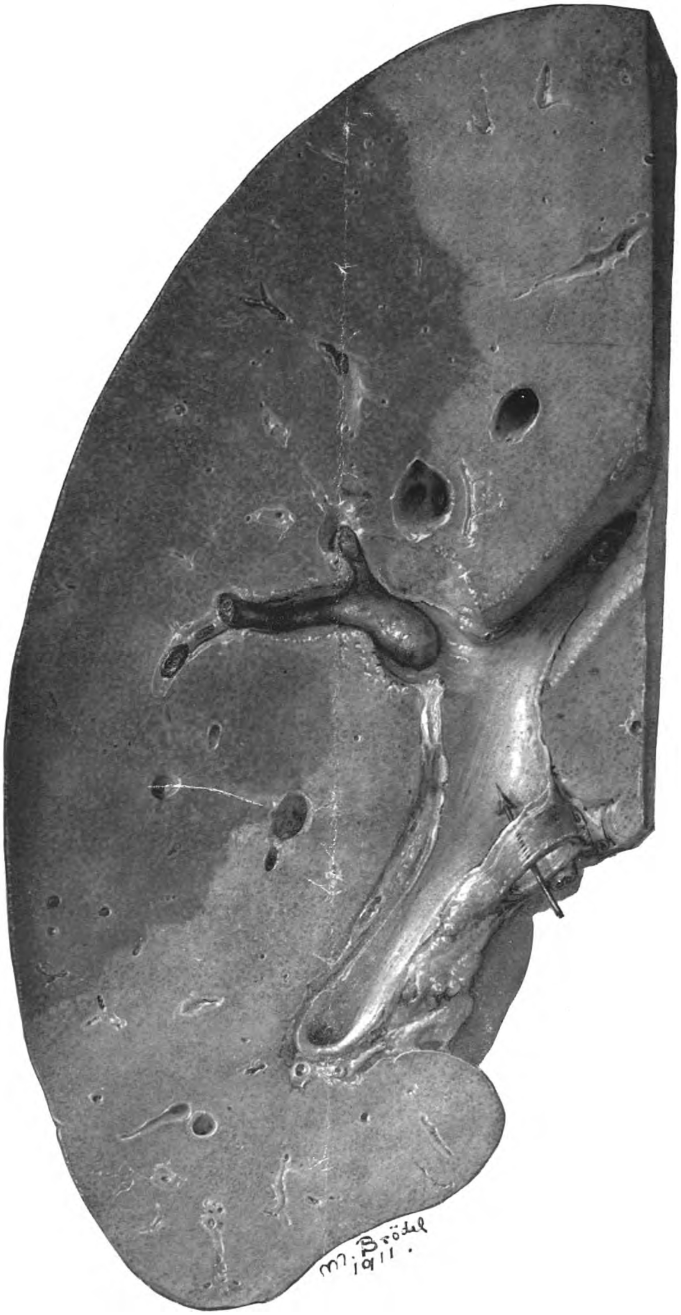
---

[22] Cohnheim and Litten: *Loc. cit.*

[23] Orth: *Loc. cit.*

[24] Chiari: *Loc. cit.*

[25] Ruczynski: *Loc. cit.*


M. Brödel
1911.

thrombi are seen projecting the cavities from minute branches of the portal vein. On ıer examination of these spaces in the liver they nearly all to be in relation to the tumors often running on one side ese. Some of the cavities are round, others very irregular, ed by numerous septa. Often the larger ones communicate. ches of both the portal and hepatic veins especially the latter ɔe traced into them. On scraping the walls no epithelium found.

ı instance of peripheral zonal necrosis, similar to that :ring in eclampsia, was found in an adult male in our ɔsy series. This is of interest because peripheral zonal ɔsis is considered by some to be the characteristic anatomiicture of eclampsia.

Occlusion of the Hepatic Artery.

ıe anatomy of the hepatic artery is such that firstly on ınt of its position at its origin from the cœliac axis it :tle disposed to emboli and secondly on account of the anastomosis of its hepatic branches with the neighboring ls—inferior phrenic, internal mammary, superior adrenal, :he arc of vessels on the lesser curvature of the stomach—sion of its branches is usually without effect.

:perimental ligation of the hepatic artery varies in its ts according to the animal which is used. In rabbits ɔses usually result, while in dogs there is very little effect from a possible slight atrophy of the liver cells in the r of the lobule (Cohnheim, Litten, Whipple, etc.).

schner ligated the hepatic artery in 26 rabbits and in one was there no necrosis. He says that the occlusion of .epatic artery which is supposed only to nourish Glisson's ıle causes degeneration of the walls of the portal vein ı leads to thrombosis and infarct formation. In man ic infarcts resulting from occlusion of branches of the :ic artery are extremely rare. To this type of infarction g a number of cases cited by Chiari; namely, those of nuller, Orth, Ogle, Kaufmann, two original contributions iari's, and two by Ruczynski who also cites cases by Bald-Heile and Bonome. Ruczynski's second case is particuinteresting for here despite thrombosis of both the ic artery and portal vein, the process had been so gradual ıo infarct, but only a local congestion with atrophy of the ɔells resulted.

iari emphasized the difference between these infarcts and resulting from occlusion of the smallest portal vein ıls. In the arterial infarct there is also necrosis of the vessels and connective tissue which are nourished by epatic artery. There are no cases of this type in our :500 autopsies.

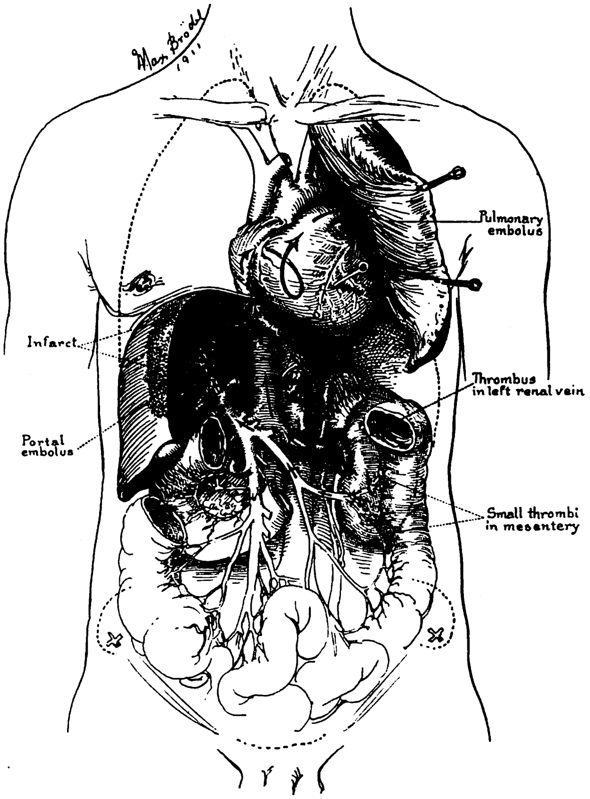
Occlusion of Hepatic Vein.

lch[26] cites a case reported by Arnold where a condition r to the "atrophic red infarct of Zahn" followed plugɔf an hepatic vein by a retrograde embolus. have almost completely ligated an hepatic vein of a dog without marked effect. The lobe of the liver a few weeks after ligation is indistinguishable from the remainder of the organ macroscopically or microscopically. This is confirmed in the following post mortem record:

F. E., white male. Autopsy No. 769. Dr. Flexner.

Anatomical Diagnosis.—Amœbic dysentery; amœbic abscess of liver penetrating into lung. Fibrino-purulent pleurisy; perforation into inferior vena cava. *Thrombosis of inferior vena cava extending into right auricle and hepatic veins.*

The inferior vena cava beginning at a point just above the rupture (of liver, abscess into cava), contains an occluding decolorized, firm, adherent thrombus, which extends upwards and projects into the right auricle which it about one-third fills. Some of the hepatic veins are thrombosed in part of their extent. The thrombi in the upper part are decolorized, but deeper in the liver tissue they are red and soft.



Conclusions.

1. On account of the extensive anastomosis of the intrahepatic branches of the portal vein and the hepatic artery, occlusion of either of them is usually without effect upon the liver parenchyma.

2. The portal vein may be completely occluded and the liver only appear slightly smaller and congested. In these cases an extensive collateral circulation usually establishes itself in the hepato-duodenal ligament and the portal blood is in this way carried to the interlobular vessels.

---

[26] ılch: Thrombosis and Embolism; Allbutt: System of Medi- .899, VII, 280.

3. Following occlusion of the portal vein the entire liver, if it is the main branch, or only the part supplied by the occluded vein may present a much more congested appearance. This is due to the insufficiency of arterial anastomosis which is enough to nourish the liver cells and prevent necrosis, but which allows the blood from the systemic veins to dam back into the liver capillaries. This picture is only produced when the general circulation is impaired.

4. When the smaller interlobular branches of the portal vein are occluded the anastomosis with the hepatic artery becomes ineffectual and there is a total mechanical obstruction of the circulation in the area. This is followed by infarct formation. There is necrosis of the liver cells often accompanied by hemorrhage. The necrosis of eclampsia belongs to this group.

5. Occlusion of branches of the hepatic artery may result in true infarct formation. This is rare, firstly, on acc its peculiar position at the cœliac axis, and secondly be of its abundant anastomoses.

6. Occlusion of both the portal vein and the hepatic results in infarct formation unless the process is very g

7. Occlusion of the hepatic vein may bring about a gestion in the zone drained by it or may be absolutely effect.

The accompanying illustrations, kindly made by Pr Brödel, illustrate very well the course of the various in Case 12, and secondly the resultant wedge-shaped congestion following the localization of the embolus in the large right branches of the portal vein.

THE TEACHING OF EXPERIMENTAL PATHOLOGY AND PATHOLOGICAL PHYSIOLOGY TO LARGE CLASSES.*

By Richard M. Pearce, M. D.,

Professor of Research Medicine and of Pathology, University of Pennsylvania.

The course in experimental pathology and pathological physiology here presented in outline, is an attempt to bring physiology into relation with morphology and symptomatology and thus to fill the gap which exists between the autopsy room and the laboratory of pathological histology on the one hand and the clinic on the other. Many teachers of pathology, following the lead of Cohnheim, have, it is true, introduced into their class work demonstrations illustrating some of the important problems of pathological physiology; but these have usually been perfunctory demonstrations given in a fragmentary way before the entire class, and without, as a rule, the utilization of the methods of exact registration employed in physiology. Of an entirely different character is the method which was followed for several years by Dr. W. G. MacCallum at the Johns Hopkins Medical School and is continued there along similar lines by Dr. Whipple. In this course a class of eight students worked for a period of two to three months on one organ or a group of related organs, utilizing all the methods which experimental pathology could bring to bear on the problems under consideration. The value of such a course cannot be over estimated and it should have, as an elective, a place in the curriculum of every good medical school. It has, however, the disadvantage that it cannot be given, on account of the great detail of the work, to all the members of a large class and must remain essentially an elective course combining instruction and research for a small number of students.

For a long time, it has seemed to me desirable that a course in experimental pathology should be developed which, while including as far as possible valuable features of MacCallum's "small group" course, should at the same time be so arranged as to be available to all the members of a large class. Amphitheatre demonstrations are not advisab only the few men close to the demonstration table by such procedures. Likewise individual work by the such as is now given in our better courses in experi pharmacology, is out of the question, for the present a on account of the lack of equipment and space in most laboratories of pathology. The course which I have during the latter half of the past academic year has compromise between these two methods, in that, althou demonstration method has been used, the number of strations in one period has been sufficient to break class into small groups. Thus a class of 90 men has divided into two sections, each section meeting, durin weeks, once a week for one hour. At these sessions five demonstrations, each under the direction of a m of the department, have been presented simultaneously. each section of 45 men was subdivided into five groups men, and each of these had at least 12 minutes for a stration. The room in which the course was given was size sufficient to allow a wide space between the demon tion tables, and also to allow the passage of groups table to table, on signal, without confusion.

The general scope of the course was based in p Cohnheim's classical experiments, MacCallum's cour Hopkins, Rous' course at Michigan, Longcope's course in "medical correlation" given last year at this and the demonstration courses to physicians given for years in the Medical Department of Columbia Univ and in part on an extensive personal acquaintance wi methods of experimental pathology and their possi The course is not to be considered as complete or or as in every way ideal, but rather as a tentative of what has, in my hands, proved most satisfactory instruction of large classes. The possibilities of enlar

---

* Read before the International Association of Medical Museums, C [illegible] April 13, 1911.

y one familiar with the methods of physi-
gy and chemistry as applied to experimental pathology.
he following outline is a copy of the mimeographed sheets
en each member of the class two days before the demon-
tions:

EXERCISE I.

Blood Destruction and Jaundice.

le I. (a) Rabbit which received, three days before demonstration, 0.001 gm. rattlesnake venom in ear vein. Note *hemoglobinuria*, the result of the hemolytic action of snake venom.

(b) Dog which received, three days before demonstration, 0.2 cc. of hemolytic immune serum per kilo of body weight in saphenous vein. Note *hemoglobinuria* (and jaundice ?).

le II. Experiments *in vitro* explaining phenomena seen above *in vivo* (hemagglutination and hemolysis).

le III. (a) Rabbit which received, 24 hours before demonstration, 0.001 gm. cantharidin in acetic ether, subcutaneously. Result: *Free blood in urine* (hematuria), *not hemoglobinuria*—equivalent to a hemorrhagic nephritis.

(b) Microscopic preparations showing the sediment of the urine of (1) *hematuria* (red blood corpuscles present) and (2) *hemoglobinuria.*

le IV. (a) Dog with *jaundice*, the result of the ligation of the common bile duct for three days. Note skin, conjunctiva and urine.

(b) Tests for bile in urine of Ib and IVa.

e V. (a) Test for albumin in urine of Ia, Ib, IIIa, IVa.

(b) Spectroscopic test of urine of Ib.

(c) Microscopic sections illustrating the changes in the various organs of the above animals.

EXERCISE II.

Degeneration and Necrosis.

e I. (a) Rabbit: Gross demonstration of *cloudy swelling* ue to repeated injections of cantharidin in ether.

(b) Microscopic preparations of liver and kidney treated ith salt solution and acetic acid.

II. (a) Rabbit: *Fatty changes* due to poisoning by phoshorus.

(b) Microscopic preparations treated by acetic acid, Sudan II and osmic acid.

III. (a) Dog: *Necrosis* from loss of blood supply. Ligaion of superior mesenteric artery and one branch of renal rtery.

(b) *Gangrene* in guinea pig's leg secondary to ligation of moral artery and vein.

IV. (a) Rabbit: Illustrating gas formation in *emphyseatous gangrene.* Injection of *B. aerogenes capsulatus* in r vein; animal then killed and placed in thermostat at .5° C. for 24 hours.

(b) Microscope with preparation of *B. aerogenes capsulatus.*

V. (a) Guinea pigs showing *caseation* of tuberculosis. our weeks after injection of bovine tubercle bacilli into ritoneal cavity.

(b) Microscope with preparation of *B. tuberculosis.*

EXERCISE III.

Inflammation and Repair.

I. (a) Ear of rabbit exposed to water at 56° C. for three inutes—condition after 24 hours.

(b) Ear of rabbit 24 hours after rubbing with croton oil.

(c) Microscopic preparations illustrating histology of each.

48-hour lesion.

(b) Ditto due to injection of turpentine, 48-hour lesion.

$\left.\begin{matrix}(c)\\(d)\end{matrix}\right\}$ Microscopes with exudate from $\left\{\begin{matrix}(a)\\(b)\end{matrix}\right.$

Table III. (a) Rabbit: Multiple *embolic abscesses* resulting from injection of staphylococcus pyogenes aureus in ear vein, 48-hour lesion.

(b) Microscopic preparations illustrating lesion in kidney.

Table IV. Dog: *Repair* of *aseptic wound*, 3 days.

Table V. Dog: *Repair* of *infected wound*, 3 days.

Compare carefully gross appearance of Ia and Ib.

Compare carefully gross appearance of IV and V.

EXERCISE IV.

Thrombosis, Embolism, Infarction.

Table I. Rabbit: *Multiple bland infarctions* due to embolism produced by injection of foreign particles (tobacco seed). (Compare with multiple embolic abscesses due to injection of *Staphylococcus pyogenes aureus*, as seen in last weeks' exercise.)

Table II. Dog: *Air embolism* with graphic registration of changes in blood pressure, heart action and respiration. Ether anesthesia. Autopsy showing method of demonstrating air in heart cavities.

Table III. (a) Dog: *Thrombus* in jugular vein resulting from injury to intima caused by mechanical pressure.

(b) *Thrombus* formation in ligated artery (femoral).

Table IV. Sections of liver and spleen showing *hyalin thrombi* composed of agglutinated red blood corpuscles. From dog which received hemolytic (also hemagglutinative) serum (see Exercise I) and died after one hour; also sections from animals similarly treated, showing necrosis of the liver after twenty-four hours.

EXERCISE V.

Heart.

(All experiments under ether anesthesia.)

Table I. *Hydropericardium:* Experimental condition produced by introducing a large amount of salt solution into the pericardial cavity. Graphic registration of effect on heart action and arterial and venous pressure. Artificial respiration.

Table II. *Myocarditis:* Production of myocardial insufficiency by injection of alcohol into heart substance. Graphic registration of effect on heart action and blood pressure.

Table III. *Valvular Insufficiency:* Mechanical rupture of aortic valve by instrumentation through carotid artery. Graphic registration of effect on heart action and blood pressure.

EXERCISE VI.

Lungs.

(All experiments under ether anesthesia.)

Table I. Graphic registration showing effect of double *Hydrothorax* on respiration, heart action and blood pressure. Hydrothorax produced by injection of salt solution.

Table II. Demonstration of the anatomical relations in the thorax under above conditions, *Atelectasis.*

Table III. *Emphysema:* The lungs of a guinea pig in the experimental condition known as anaphylaxis. The gross appearance of the lungs is similar to that of emphysema.

Table IV. (a) "*Deglutition*" *pneumonia;* due to foreign particles in bronchi.

(b) *Purulent pleuritis* (empyema) due to *Staphylococcus pyogenes aureus.*

Table V. *Edema of lung;* produced by infiltration of lung with salt solution. Graphic registration of effect on heart, blood pressure, and respiration.

EXERCISE VII.

STOMACH AND INTESTINE.

Table I. Experimental *Toxic gastritis*, due to (a) carbolic acid and (b) corrosive sublimate.

Table II. Experimental *Toxic gastritis*, due to (a) sulphuric acid and (b) nitric acid.

Table III. Experimental *Toxic gastritis*, due to caustic alkali (sodium hydrate).

Table IV. Experimental *Peptic ulcer*, produced by injecting serum beneath mucosa and by excising small portion of mucosa.

Table V. *Intussusception* and *Volvulus* of Intestine and *internal hernia.*

(All lesions produced under ether anesthesia followed by death from chloroform.)

EXERCISE VIII.

PANCREAS.

Table I. Hog: Acute *hemorrhagic* and gangrenous pancreatitis and *Fat necrosis* following injection of bile into pancreatic duct. Lesions of twenty-four hours and forty-eight hours respectively.

Table II. Ligation of duct for period of two months; slight *atrophy;* no glycosuria.

Table III. *Experimental Diabetes* following extirpation of pancreas.

Table IV. *Phloridzin Diabetes.*

Table V. Tests for sugar in the urine of all of above.

EXERCISE IX.

LIVER.

Table I. Multiple focal necroses of liver due to the injection of hemolytic and hemagglutinative immune serum.

Table II. Necrosis of liver due to prolonged inhalation of chloroform.

Table III. Obstructive Jaundice.

Table IV. Demonstration of a "spontaneous" cirrhosis of the liver in the dog.

Table V. (a) Sections illustrating microscopic picture in above lesions.

(b) Tests illustrating changes in the urine in I, II, and III.

EXERCISE X.

KIDNEY.

Table I. Acute nephritis in rabbit due to injection of 0.06 gm. potassium chromate. Essentially a tubular injury. 48 hours.

Table II. Acute nephritis in rabbit due to injection of 0.05 mg. rattlesnake venom. Essentially a vascular nephritis. 48 hours.

Table III. Acute nephritis with *edema* in rabbit. Due to injection of uranium nitrate and the administration of an excess of water by stomach tube. 5 days.

Table IV. Demonstration of factors influencing vascular reactions and diuresis in experimental nephritis. Oncometric studies.

Table V. (a) Urine of each of above showing albumin and casts.

(b) Stained sections of similar lesions.

Table VI. Hydronephrosis. 6 weeks after ligation of one ureter.

EXERCISE XI.

HYPERSUSCEPTIBILITY (Allergy).

Table I. *Peculiar natural hypersusceptibility* to rabbit and to rabbit serum in case of a human patient.

Table II. *Experimental anaphylaxis:*

(a) Morbid anatomy and histology of the lungs of lactic guinea pig.

(b) Physiology of anaphylactic "shock" in dog.

IMMUNITY.

Table III. *Combination of toxin and anti-toxin:*

(a) Guinea pig injected with diphteria toxin; (b) pig injected with diptheria toxin and protected by anti
(c) control animal injected with anti-toxin alone.

(d) Similar series with tetanus toxin and anti-toxin.

Table IV. (a) *Agglutination* of bacteria and of blood specific immune sera.

(b) *Precipitation* of dissolved proteins by specific sera.

Table V. *Cytolysis:* (a) Hemolysis by means of specific mune sera in high dilutions, by natural hemolysins hematoxic agents, e. g., rattlesnake venom.

(b) *Fragility* of erythrocytes as shown by the use solutions of varying tonicity.

Table VI. *Complement Fixation:* (a) Phenomenon cipitins and other immune sera.

(b) Wasserman reaction.

EXERCISE XII.

DUCTLESS GLANDS. INTERNAL SECRETION.

Table I. Local Vaso-constrictor effect of adrenalin as rabbit's ear.

Table II. Effect of adrenalin on blood pressure as seen in

Table III. Adrenalin glycosuria. Rabbit.

Table IV. Result of extirpation of adrenals. Dog.

Table V. Effect of extracts of hypophysis on blood press diuresis, as seen in dog.

Table VI. Tetany in parathyroidectomized dog.

Table VII. Effect on tetany of injection of a calcium salt

Table VIII. Review Exercise VIII, Demonstration III. Re extirpation of pancreas.

EXPERIMENTAL PATHOLOGY AND PHYSICAL DIAG

EXERCISE XIII.

(In collaboration with Dr. W. T. Longcope.)

(All dogs under ether anesthesia and with tracheal artificial respiration and mechanical ether dropper.

Table I. *Normal dog:* By percussion and auscultation normal physical signs of respiration and the outlines lungs.

Table II. *Pneumothorax:* Normal dog. Note changes sical signs produced by injection of air (200 cc.) into cavity.

Table III. *Hydrothorax:* Due to injection of 400 cc. nor solution into pleural cavity. Note change in level of on altering position of dog and of percussion notes ratory sound above and below level of fluid.

Table IV. *Acute Pleuritis:* Right side, 3 cc. turpentine into pleural cavity one hour before demonstration side, same amount injected at beginning of demon Compare friction rubs on both sides.

râles.

At autopsies on the above animals note:

le I. Collapse of lungs and their position in relation to thoracic wall. Appearance of pleural surface.

le II. Clamp tracheas before opening thorax, note condition of lungs.

le III. Clamp tracheas, note level of fluid and compare with level determined by percussion. Note compression of lungs.

le IV. Note amount and character of exudate on each side and appearance of pleura.

le V. Note condition of bronchi; look for sclerosis and congestion.

(In connection with above, review Exercise VI.)

EXERCISE XIV.

(In collaboration with Dr. W. T. Longcope.)

dogs under ether anesthesia with tracheal canula, artificial respiration and mechanical ether dropper.)

le I. *Normal dog:* Note normal heart sounds, over different regions of thorax. By palpation and percussion note area of cardiac dullness.

le II. *Normal dog:* Thorax and pericardium opened. Note action of heart. Study heart sounds by auscultation directly over various regions of heart.

e III. *Aortic regurgitation:* (a) Aortic cusp destroyed by instrumentation through left carotid artery. Note changes in heart sounds and cardiac dullness. (b) Same with thorax and pericardium opened; direct auscultation.

e IV. *Aortic stenosis:* Thorax and pericardium opened. Aortic stenosis produced by tightening ligature about base of aorta. Note heart sounds and changes in shape, size and position of the various chambers of the heart.

(In connection with above, review Exercise V.)

hese demonstrations, it is seen, include the presentation ecrosis and the degenerations, inflammation and repair, l destruction and jaundice, thrombosis, embolism and testines, liver, pancreas, and kidney, and the problems of infection and immunity, of shock and hemorrhage and the physiology of the ductless glands.

With the exception of Exercises II, III, IV, XI, the experimental work was presented in connection with the general pathology and pathological histology of the subject under consideration. Physiological methods of graphic registration were used whenever possible; changes in the urine and other secretions demonstrated; and the methods of chemical diagnosis emphasized.

The planning of the course is no small matter and the labor of preparation * is great, but the actual demonstrations are not difficult; even if they were, the change in the attitude of the student toward pathology, which such a course brings about, makes it well worth while. This is particularly true of Exercises XIII and XIV which, given in collaboration with Dr. W. T. Longcope as a part of the course in Physical Diagnosis, were received with the greatest interest. To let the student produce, or see produced, certain anatomical lesions, and to allow him to study the alterations of function which result, applying thereto many of the clinical methods, and eventually at autopsy to correlate the disturbances in physiology with the anatomical changes, is, I believe, a most valuable preparation for clinical study in that it bridges the gap between pathological anatomy and clinical observation. Herein lies the chief value of courses in experimental pathology and pathological physiology.

---

* The success of this course, as given during the past year, is due in largest measure to the efforts of my assistants, Drs. A. B. Eisenbrey, H. T. Karsner, B. S. Veeder, and J. H. Austin, upon whose shoulders fell the burden of preparation.

PROTEST AGAINST THE INDISCRIMINATE USE OF THE ORGANIC COMPOUNDS OF SILVER IN OPHTHALMIC PRACTICE.*

By Samuel Theobald, M. D.,

Clinical Professor of Ophthalmology and Otology, The Johns Hopkins University.

atever be the explanation, whether due to their chemical osition, the greater freedom with which they are used, their supposedly greater penetrating power, there can doubt that the organic compounds of silver—at all s, those with which I am familiar, protargol and argyrol responsible for many more cases of conjunctival argyria ever was, or is, silver nitrate.

fore these compounds came into use, argyria of the coniva was a rare condition—practically never seen except l cases of trachoma. Now, it is relatively common, and t with not only in chronic conditions, such as trachoma, acute affections as well, in which the silver treatment een of comparatively brief duration.

I believe I am warranted in saying that I have never produced a case of ocular argyria from the use of silver nitrate. I regret that I cannot say the same as to the newer silver compounds. In several of my cases of gonorrhœal conjunctivitis in the adult decided staining, especially of the bulbar conjunctiva, has resulted from the employment of protargol, and the same has happened in a case of acute trachoma after only a few weeks treatment.

I have also observed a number of cases of similar character which have occurred in the practice of my confrères. A well-known physician of Baltimore was given a five per cent solution of argyrol for a mild chronic conjunctivitis. As its action was beneficial, his wife—in need only of glasses for the correction of a decided fault of refraction—also began to use it, and the two continued to employ it, p. r. n., until the physician had acquired one of the most marked cases of

---

ad before the American Ophthalmological Society, July 11, argyria I have ever seen, and his wife's eyes had become conspicuously stained.

Let me make it plain, that I have no unreasoning prejudice against these newer silver preparations. On the contrary, I have such faith in protargol, especially, that for some years I have employed it in the treatment of gonorrhœal conjunctivitis, both in the infant and the adult, to the exclusion of silver nitrate, and in trachomatous conjunctivitis, especially in the acute stage, it has also been my chief reliance.

It is, therefore, not against the *use,* but against the *indiscriminate*—or, perhaps, I might say indiscriminating—use of the organic silver compounds that I would protest. When a remedy is at hand, that is, at least, as efficacious as they are in the condition to be dealt with, that is cleanly and that cannot by any possibility produce the untoward consequences to which, as has been pointed out, they not give rise, common sense would seem to dictate that it the preference.

These observations apply with especial force to the almost, it would seem, universal habit, particularly the younger generation of ophthalmologists and of practitioners, as well, of employing argyrol or protargol the treatment of acute and chronic catarrhal conjunc This practice, in my judgment, and it is based upon observation, is wholly indefensible, since we have a in a collyrium containing half a grain of zinc sulphate ten or twelve grains of boracic acid to the ounce— cleanly, and that is not simply *as* efficacious, but is surely and more promptly efficacious in these conditions either of the silver compounds mentioned.

NOTES ON JAUNDICE IN PNEUMONIA.

By Fletcher McPhedran, M. B.,

Assistant Resident Physician, The Johns Hopkins Hospital.

Since Bettelheim and Leichtenstern first reported the occurrence of jaundice in lobar pneumonia, many explanations of its pathology have appeared in the literature. Bouillaud considered it due to a transfer of the infection to the liver; Niemeyer to pressure of the hepatized lung on the torpid liver; Virchow and Leyden to an associated duodenal catarrh resulting in simple jaundice.

Banti[1] thought it due to a specific hæmolytic action of the diplococcus pneumoniæ, probably general in its distribution but maximal in the spleen. He found that hæmoglobinuria occurred in rabbits after infection with the pneumococcus. This hæmoglobinuria was not an index of the virulence of the germ, but was caused by a pneumococcus that had produced jaundice in man. In dogs he produced bilirubinuria, and concluded that in man the pneumoccoccus produced bilirubin which was changed in the tissues to urobilin, causing jaundice, and was excreted as urobilin.

Obermayer and Popper[2] investigated 134 cases of pneumonia, demonstrating pathological amounts of pigments (bilirubin, urobilin and biliverdin) in all urines, and found that these pigments had been described as urobilin, because the tests employed had not been sufficiently accurate to differentiate them. When the pigments were present in sufficient quantities to give the less delicate tests, jaundice appeared. They considered the jaundice hæmolytic and dependent upon the intensity of the infection. At autopsy they found large quantities of pigments in the hepatized and slight amounts in the congested areas, but felt that the color might be due to the pigments in the serum of the affected regions.

Herzfeld and Steiger[3] found pigments with great difficulty or not at all in the urines of patients whose sputa readily yielded them. As the pigments were only found when blood was mingled in the sputum, they concluded that they came from the extravasated red blood cells of the hepatization, and *in vitro* were able to show that the pneumococcus from hæmoglobin a body giving the color reaction bilirubin.

Troisier[4] had meanwhile described the icterus as this local destruction, comparable to that observed in rhagic pleurisy, where diminished corpuscular resistan hypotonic sodium chloride solutions is found, and bile pigments are produced apart from the liver. local area of destruction the pigments are carried the body.

Lemierre and Abrami[5] found in two cases pure the pneumococcus in the bile associated with no tion, but a definite degeneration of the liver cells. thought all pigment must come from the liver.

It seemed that it might be a matter of interest to the corpuscular resistance in a series of cases of lobar monia with and without jaundice, in order to determi question as to whether any of these cases might diminution of corpuscular resistance. During the last fourteen cases have beeen examined. The corpuscles tested against solutions of chemically pure sodium progressively diminishing in strength from 0.6 per cent to 0.26 per cent. The blood was received into a citrate tion in 0.85 per cent sodium chloride, washed three times sodium chloride solution, and then the sedimented dropped into tubes, each of which contained 3 cc. hypotonic sodium chloride solution. After two 37 degrees C., the tubes were placed on ice and again after twenty-four hours. All glass ware was and the solutions sterile. Three readings were made. point of initial, marked and complete hæmolysis. initial hæmolysis should be at 0.42 per cent, marked per cent and complete at 0.26 per cent.

The urine was tested for urobilin, but in no case ld be discovered by vital staining as described by ıghan.[6] There was not any increase of the number of red d cells so stained.

PNEUMONIAS WITHOUT JAUNDICE.

e.	Race.	Sex.	R. B. C.	Initial.	Marked.	Complete.
.	C.	F.	5,200,000	40	36	30
.	W.	M.	5,232,000	42	36	32
.	W.	M.	5,416,000	44	36	28
.	W.	M.	3,300,000	42	36	32
.	W.	M.	5,300,000	50	40	38
.	W.	M.	4,900,000	44	36	30

PNEUMONIAS WITH JAUNDICE.

.	Race.	Sex.	R. B. C.	Initial.	Marked.	Complete.
	C.	F.	4,500,000	30	28	26
	C.	M.	4,704,000	38	34	26
	C.	M.	4,300,000	40	34	26
	W.	F.	5,250,000	40	34	28
	W.	F.	4,080,000	42	34	30
	C.	M.	5,280,000	44	38	30
	C.	M.	5,300,000	36	30	26
	W.	M.	4,800,000	38	32	26

se No. 5 is noteworthy in view of the increased fragility e cells found, but attempts to follow up the patient outthe hospital have been unsuccessful. He was not in the jaundiced and showed no increase in reticulated cells. is interesting that in cases Nos. 7, 8 and 13, where ally the jaundice was most intense, and bile pigments readily found in the urine, the fragility was diminished, is, the same condition obtained as was described by er in obstructive jaundice.

e use of saponin (Merck's "purissimum") for hæmolyadvocated by McNeill[7] was also tried, but the results series of control cases were not sufficiently accurate to nt its continuance. He took a suspension of washed scles in such an amount that there were about 50,000,ells, to which varying amounts of a saponin solution 04 gm. to 100 cc. of 0.85 per cent sodium chloride were . Then the mixture was brought to a volume of 2 cc. re of the same sodium chloride solution and the num red blood cells were counted on a Thoma Zeiss hæmoeter. After incubation at 37 degrees C. for two hours, emaining cells were enumerated and the amount of lysis observed.

NORMAL ADULT.

R. B. C. suspension in NaCl 0.85 per cent.	Saponin.	NaCl 0.85 per cent.	Corrected Number R. B. C.	R. B. C. after 2 hours.	Per cent. of Hæmolysis.
cc.	cc.	cc.			
.15	.08	1.77	43,000,000	41,700,000	46
.15	.08	1.77	50,500,000	34,500,000	32
.15	.12	1.73	42,000,000	28,000,000	33
.15	.12	1.73	41,200,000	27,600,000	34
.15	.16	1.69	42,000,000	28,000,000	33
.15	.16	1.69	41,200,000	36,400,000	08
.15	.2	1.65	42,000,000	31,000,000	26
.15	.2	1.65	40,300,000	26,200,000	35
.15	.24	1.61	42,000,000	1,000,000	97
.15	.24	1.61	42,000,000	24,600,000	41

Tube No.	sion in NaCl 0.85 per cent.	Saponin.	NaCl 0.85 per cent.	Corrected Number R. B. C.	R. B. C. after 2 hours.	Per cent of Hæmolysis.
	cc.	cc.	cc.			
1	.13	.1	1.77	46,700,000	36,000,000	21
2	.13	.2	1.67	55,600,000	25,000,000	54
3	.13	.3	1.57	54,000,000	29,000,000	46

Now we see in the above that the same experiment repeated with the same technique on one individual gives widely variant results; for example, compare tubes 3 and 3a and tubes 5 and 5a. Nevertheless, there is a very slight, if any, difference in the figures of hæmolysis in the case of jaundice in pneumonia and in the normal adult.

Two cases, Nos. 7 and 8, came to autopsy; in neither was there any obstruction to the bile ducts, nor any destruction of liver cells, nor any increase in pigment found by the usual methods.

The number of red blood cells on admission was interesting; it averaged 4,840,000 for the males with jaundice and 4,400,000 for the females. In cases without jaundice, the number was 4,800,000 in males, and 5,200,000 in the only female. A series of typhoid fever patients comparable in age and duration of disease to this pneumonia series averaged 5,900,000 for males and 4,500,000 for females.

From the fact that the cells are in the lungs in such numbers, and that the pneumococcus has definite hæmolytic powers, together with the property of producing bile pigments, it is probable that the jaundice arises from the pigments produced in the lungs; but as all patients with pneumonia have this extravasation, there must be some other cause, perhaps a variation in the pneumococcus. This is not associated with the general increase in the fragility of the red blood cells.

SUMMARY.

1. In the fourteen cases there was increased fragility in only one case, this without jaundice; but in the cases with most marked jaundice there was, on the contrary, an increase in the corpuscular resistance.

2. The urine in no cases showed any excess of urobilin.

3. Bilirubin was present in the urine in three of the eight cases with jaundice.

4. Autopsy showed no evidence of special changes in the liver.

5. The blood counts showed such a loss that one must consider it as due to a sudden great destruction. This loss is probably due to the hepatization.

In concluding, I desire to thank Dr. W. S. Thayer for constant advice and assistance.

BIBLIOGRAPHY.

1. Banti: Centralbl. f. Bakteriol. und Parasitenk., 1896, XX, 849.
2. Obermayer and Popper: Wien. klin. Wchnschr., 1908, XXI, 895.
3. Herzfeld and Steiger: Med. Klinik, 1910, VI, 1415.
4. Troisier: Compt. rend. Soc. de biol., 1909, LXVIII, 46.
5. Lemierre and Abrami: Presse méd., 1910, XVIII, 82.
6. Vaughan: J. M. Research, 1903, V, 342.
7. McNeill: J. Path. and Bact., 1910, XV, 56.

ABDOMINAL LIPECTOMY.

REPORT OF TWO CASES.

By W. F. Shallenberger, M. D., Atlanta, Ga.,
Late Resident Surgeon, Maryland Hospital for Women, Baltimore.

This operation,[1] while no longer rare, is uncommon enough to warrant the report of these two cases, which came under my care at the Woman's Hospital in Baltimore.

Mrs. S., age 39, was sent to the hospital by her physician in March, 1910, for symptoms of a chronic appendicitis from which she had suffered for several years and which had been becoming more aggravated. She had a more or less constant pain in the right lower quadrant of the abdomen, which was quite severe at times. There was also nausea and vomiting occasionally, and constipation. No history of jaundice or urinary disturbance was obtained. The menstrual history was negative. The patient had had several children. Backache was the only symptom that suggested any pelvic trouble.

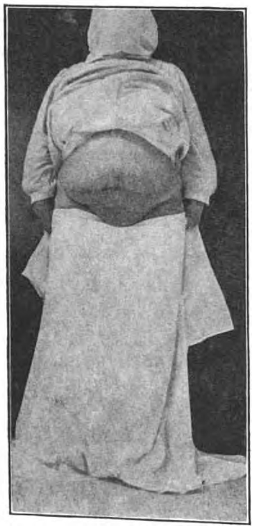


Fig. 1.

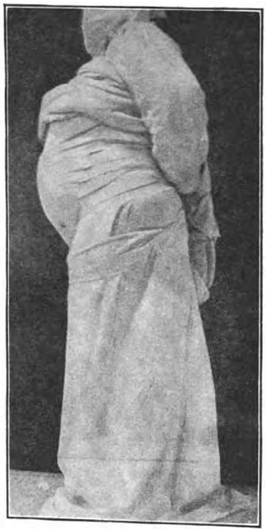


Fig. 2.

Fig. 1.—Healed incision in first patient showing the support the umbilicus gives. (Patient is standing.)
Fig. 2.—First patient, showing the abdominal supporter worn after operation.

Eight years ago the patient had an attack of typhoid fever, after which she began to grow very stout. Prior to this attack she had been of average size.

Examination.—The patient was quite fat, weight 227 pounds, of medium height. The outlines of her figure were good, except of the abdomen, which was very full and flabby, with a regular apron of fat that hung down over the symphysis when the patient was standing. One could pick the fat up in a great ridge or fold across the lower abdomen. The greatest deposit of fat was below the umbilicus, and it prevented the wearing of an abdominal supporter becaus flabbiness. The abdominal walls were firm beneath th

On the right side there was tenderness over the ap region, with slight muscle rigidity. The temperatu normal. The pelvic organs were normal except for a laceration of the cervix uteri and a moderate relaxa the perineum. The backache I thought was due to the p lous abdomen.

The patient received the suggestion that some of t be removed with much enthusiasm and was very eage the operation be performed.

Operation.—A double incision was made from fla flank below the umbilicus and embracing an elliptoid a skin 45 cm. or 18 inches long, and 15 cm. or 6 inches widest part. The incisions were carried down to the and the wedge or slice of skin and fat removed. Its w was a trifle over 7 pounds.

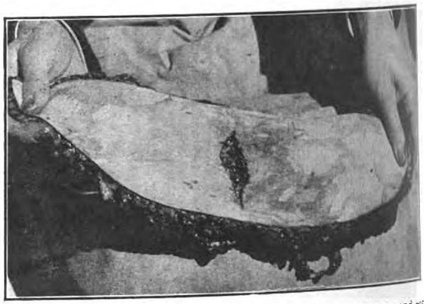


Fig. 3.—The slab of skin and fat removed in the second c

All the bleeding points were carefully secured and t of the two sides of the open area was brought togethe a number of double figure-of-eight catgut sutures. Th edges were then approximated. Three silver-wire sutur first placed, and silkworm gut used to complete the ap mation. Four rubber tissue drains were inserted, one i angle of the incision and the others midway betwe angles and the median line. These drains were remo the third day.

Before the incision was closed, the peritoneal cavi opened on the right side by a McBurney incision th the muscles and fascia and the appendix removed. I large, injected and adherent.

The incision, which was 18 inches long, healed nic the patient had a rapid convalescence. She was grea lieved, not only of the appendix symptoms but als backache. I have seen her a number of times since, a is highly pleased with the results. We had an abd supporter made for her and this fits perfectly now. (F

Mrs. P., a patient of Dr. Kelly, came to the hosp

---

[1] Kelly, H. A.: Excision of the Fat of the Abdominal Wall—Lip[illegible] Surg., Gyn., and Obst., 1910, X, 229.

e several years ago, and the patient had an incision in-
ion and a peritonitis following. Aside from the hernia
:e were also extensive intestinal adhesions giving rise to
siderable abdominal pain. There was a considerable de-
it of fat in the abdominal wall.

'peration.—A double transverse incision was made from
k to flank, 38 cm. long and the two lines 12 cm. apart in
median abdominal line. The slab of fat was removed
g. 3) and the peritoneal cavity opened through the
nial sac. The intestinal adhesions were all separated and
hernia repaired by overlapping the fascia in the mid-line.
fat and skin edges were then brought together in much
same manner as in the first case, silkworm gut alone
ıg used for the skin. Cigarette drains were placed in
ı angle of the incision.

'he patient made an uneventful recovery and left the
pital greatly benefited by the operation.

n neither of these cases was there an umbilical hernia, and
ish to bring out a point here; namely, that where there
ıot an umbilical hernia the incisions should be made be-
the umbilicus, leaving it as a supporting point. This is
wn in Fig. 1, where the highest point of the incision, as

down on each side.

Dr. Kelly did the first operation of this kind in 1899.[2] Since then he has had eight more cases, including the one reported here.

Maylord[3] reports three cases in which he did extensive lipectomy in fat women with umbilical herniæ. The first of his cases was done in 1903, and ten pounds were removed.

Weinold[4] reports a case in a woman with an enormously fat abdomen.

The results of such an operation are, to quote Dr. Kelly: "The removal of a slab of fat and a decrease in weight. Great addition to personal comfort generally. Convenience and comfort in dressing. Better pose in standing and better poise in walking. Increased activity. Cleanliness greatly facilitated. Figure changed from unsightly and awkward to one much more natural. The sensitive patient occupying afterwards a more normal and natural relation to society."

---

[2] Kelly, H. A.: Excessive Growth of Fat, Johns Hopkins Hosp. Bull., 1899, X, 197.

[3] Maylord, A. E.: Direction of Abdominal Incisions, Brit. M. J., 1907, II, 895.

[4] Weinold: Bauchdeckenplastik, 1909, XXIII, 1332.

IN MEMORIAM.

DR. CHRISTIAN ARCHIBALD HERTER.

n response to an invitation issued by the President of the
ns Hopkins University and the committee on the Herter
norial Lectureship a meeting in memory of the late Dr.
istian Archibald Herter was held in the lecture room of the
siological Laboratory of the Johns Hopkins University on
ırsday, October 5, 1911, at 3 p. m.

rs. W. H. Welch, W. S. Halsted, and J. J. Abel of Balti-
e and E. Dunham and Simon Flexner of New York,
:e of various aspects of the life and work of Dr. Herter
paid tribute to his character and his services to medical
ıce.

he following minute was adopted and was subsequently
to the audience assembled at four o'clock to hear Pro-
ɔr Kossel's second Herter lecture, who expressed their
ɛct and approval by a rising vote:

MINUTE

ıe medical faculty and other members of the Johns Hopkins
ersity, as well as all assembled at the delivery of the sixth
s of lectures upon the Herter Foundation, desire to place
record their sense of the great loss sustained by American
cine and by medical science in the death of Dr. Christian
ibald Herter on December 5, 1910.

e initiation of Dr. Herter's fruitful activity as a scientific
ıtigator by his work as a graduate student in this University
his active interest in the development of this medical school
ources of especial gratification to the University. Upon this
ion especially we recall with grateful appreciation his gener-
ɔenefaction in founding, in association with Mrs. Herter, a lectureship which has been and will continue to be a fountain of inspiration and instruction to our faculty and students and to the medical profession.

In the life and work and character of Dr. Herter we recognize the manifestation of rare gifts of intellect and of heart and high-minded devotion to the highest ideals of our profession and of scientific medicine. By valuable contributions to knowledge, by wisely directed and generous material aid in the promotion of medical and biological science, by judicious counsel and active effort and by the widely felt influence of a richly endowed and singularly attractive and cultivated personality, Dr. Herter rendered memorable service to American medicine in behalf of higher professional standards and wider recognition and cultivation of medical science.

In this University and elsewhere the memory of Christian Archibald Herter will be cherished not only as that of a generous benefactor, but also "as a presence to be felt and known" exemplifying love of beauty, broad humanity and loyalty and devotion to the best ideals of the physician and the student of man and of nature.

We desire to express our sympathy with Mrs. Herter and her children in their bereavement and that a copy of this minute be transmitted to them.

THE JOHNS HOPKINS HOSPITAL BULLETIN.

The Hospital Bulletin contains details of hospital and dispensary practice, abstracts of papers read, and other proceedings of the Medical Society of the Hospital, reports of lectures, and other matters of general interest in connection with the work of the Hospital. It is issued monthly.

Volume XXII is in progress. The subscription price is $2.00 per year in the United States, Canada, and Mexico; foreign subscriptions $2.50.

NOTES ON NEW BOOKS.

The Principles of Pathology. By J. GEORGE ADAMI, M. D., etc. Vol. I. General Pathology by J. GEORGE ADAMI; Vol. II. Systemic Pathology by J. GEORGE ADAMI and ALBERT G. NICHOLLS, M. D., etc. Second Edition. Revised and Enlarged. Illustrated. *(Philadelphia and New York: Lea & Febiger, 1910.)*

This is not a new book, but is already in its second edition, so that there can be no question as to its value in satisfying a general need. The scope of such a book should be determined to some extent by the requirements of those for whom it is intended, and if any criticism is to be offered upon a text-book such as this, which is designed for the use of students as well as physicians, it is that here an attempt is made to cover in some way the whole field of pathology, including the fields of those subjects which are preparatory in a sense to the study of pathology, and upon a knowledge of which pathology depends. This encyclopædic plan has resulted in the production of two great volumes each of about a thousand pages, which are really more than the students in our schools of medicine can read and master in their course in pathology. It is perfectly true that, were the courses in pathology commensurate with their importance to the future physician as the foundation of his thought and action, he might readily require even more. For the practising physician who wishes to refer to a text-book of pathology these two volumes are excellent; but it is for the leisurely pathologist who sits down to peruse the new book that it—at least the first volume—affords pleasure. The second volume is a collaboration and in it the attempt appears to be made to apply the general principles to all the tissues and organs—an attempt which often leaves the impression given by the perfunctory fulfillment of a task, and which leads to an endless repetition of ideas which comes sometimes to involve the illustrations.

The prime effort is expended, apparently, upon the discussion of general pathological principles which, as everyone must agree, are rightly limited to those which affect all the tissues, and such things as the disturbances of the circulation which are so commonly treated as general pathological processes, are relegated to the chapters on the pathology of the circulation. In this way the general pathology becomes the pathology of the cell at large, its nutrition, its growth, its various activities and reactions to outward influences, and its transmission of its own characters.

In order to discuss all these things intelligibly, Dr. Adami occupies 200 pages with the normal anatomy, physiology, and chemistry of the cell, which then leads him to the problems of heredity. All this is very clearly written and deals with the more modern views of the changes which go on within the cells under more or less normal conditions. The treatment of the various causes of disease is superior to that in most books, in that he spends less space upon the minute descriptions of every kind of bacterium and animal parasite—things which can be studied to far greater advantage in special books on these subjects. Two or three of these chapters are devoted to a general review of malformations—again a subject of such enormous proportions that any general pathologist is wise to treat it summarily. The next section which discusses inflammation with fever and immunity is admirable, as one might expect from Dr. Adami's previous monograph upon inflammation. In speaking of repair, hypertrophy, regeneration, etc., he refuses to accept Weigert's idea as to the reasons for new growth after injury. This dictum of Weigert that such new growth is essentially repair due to the disturbing effect of a break in equilibrium, and not the direct effect of stimulation even in a minimal injury, has been very powerful among pathologists for years, and yet Dr. Adami presents the opposite views so forcib one can scarcely help wavering and finally accepting Doubtless there is much truth on both sides and Dr. would be the last to maintain a narrow point of view. In ing of tumors he considers the routine material adding his plan of dividing tumors into "lepidic" and "hylic" ing as they are derived from lining cells or from solid This, it seems, is merely a restatement of the idea which mann first put forth and which has been in the minds of that probably it would be simpler and easier to give attempt to trace tissues back to their origins, and to oneself with their adult form as a basis for their morph classification so that a covering layer of cells without ular substance is, for Hansemann, epithelium no matter its primary source, and tumors springing from it are accordingly.

It seems of temporary importance at any rate to strive these histogenetic questions with reference to tumors discovery of the etiological factors underlying the change the vital characters of the cells involved will surely render a great part of that.

The discussions of regressive tissue changes are esp good and the volume ends wtih their ultimate outcome—

As to the book itself, it may be said that the printing enough, the illustrations are fair—it is by no means richly trated and with the exception of diagrams and a few plates, nearly all, at least in the second volume, are from graphs. Literature references are given at times but not very complete nor always accurate—on page 381 volu and page 445 volume 1, the work of Opie has been flatter but quite unfairly ascribed to the present reviewer.

On the whole there is no doubt that this is the best book pathology in the English language. It brings forward usual material and discusses all the morbid processes and omical changes and the problems connected with them eminent fairness, clearness and sanity. It errs perhaps as far as the mere medical student is concerned on the of profusion and in theoretical discussion. It is not the work of a man whose mind is filled with the fresh p in all their colors, of the lesions he has just seen at the table, or with the movements of levers connected with heart of his experimental animal, as that of the philos person who remembers these things and formulates clear explanations which are by no means so clear to the fresh server.

Merck's Manual of the Materia Medica. Fourth Edition. (
& Co.: New York, 1911.)

This small pocket-book will be found useful by many titioners. It is divided into four parts: 1, The Materia as in actual use to-day by American Physicians; 2, Therap Indications and Prescription Formulas for the use of the Medica, and Bedside Diagnosis; 3, Classification of ments; and 4, Miscellany. It is neatly prepared and safely recommended.

What Shall I Eat? By DR. F. X. GOURAUD. Translated by
CIS J. REBMAN. Price, $1.50. *(New York: Rebman Co
1911.)*

It is rather difficult to know what view to express abo work for it is evidently intended both for the medical eral reader although it can hardly be regarded as satisf for either of them, which is generally the case in such Of the importance of proper diet there is no question, but

After this comes a statement of the effects ch article of food in particular diseases. There is every- e a tendency to quote such varying opinions that one is ently left in doubt as to what is really advised. On the debated question of vegetarianism there is rather a good n in which the writer takes the view that it is by no s advisable for general application; it may be a good regi- for many but does not suit all.

ere are a number of very curious statements here and Thus the opinion is quoted "that meat is not an aliment the mind." Again meat is forbidden in "colonial diseases," ever these may be. The author refers to a case of his own ich a man contracted typhoid fever "from eating a par- that was too far advanced." Of course he did not con- typhoid fever from any such cause. He may have suffered one of the forms of meat poisoning which sometimes re- e typhiod fever. In many places it is a little difficult to what the author means, as when he says that "the tics form a family that disregards all restrictions as to with the utmost audacity." Then we find the statement bread is a source of "humoral acidity," which sounds ous but it is not easy to understand what is meant by Coffee is referred to as a "nerve food"; it certainly is a curious use of terms in a work devoted to a discussion t. The author condemns the drinking of water before or eating but gives no reason for this sweeping statement. robability is that many people are greatly aided by taking before meals. Neither does he give any reason for the nent that ice water, or even cold water, is "ever harmful." the discussion of alcohol the following comment is made: mally alcohol acts through the kidneys. It is burned up and eliminated in the form of water and carbonic acid." certainly seems rather a curious statement. Then again l is described as being a nervine and is stated to cause a oil of excessive excitation, which is fatally followed by unced depression. . . . ." This succession of alternatives d to lay the foundation for gastritis and cirrhosis of the

t the book is intended for popular reading is shown by clusion of a glossary. It would have been well if this een more carefully edited. Thus we find that atheroma ned as a tumor. This is perhaps interesting as a guide to rivation of the term but of course is not accurate in refer- o its usage in this work or in medical writing.

can not see that a book such as this is of any value. It likely that it will be of any special help to the members profession and certainly for the public it can not be re- as a satisfactory guide. Take such a statement as this, habit of finishing every meal with a bit of cheese often proves fatal to men of the world." This suggests many ns which no doubt occur to the reader. Such a statement one distrust the writer of it as a good guide in matters t. Altogether the reading of this work will give the l reader much more amusement than profit, but even so not be advised as worth the time.

tical Medical Dictionary. By THOMAS LATHROP STEDMAN, M., M. D. Illustrated. Price, $5. (*New York: William od & Co., 1911.*)

Stedman has had much experience in editing medical and this dictionary is at once an evidence of his learning ll. It is, we believe, the best of its kind in the English lan- Those interested in the origin of words will take especial tion in using it, since, so far as possible, the editor has words made from both Greek and Latin, but whenever possible a pure Greek or Latin word. Such efforts are however, as Dr. Stedman well recognizes, often vain. Take for example the word "appendicitis," which is a barbarism but it is so well established by use that there is no hope of changing it. Dr. Stedman shows that the proper term would be "scolecoiditis"; this sounds strange to our ears, but had it been as long in use as appendicitis, it would be no stranger to us than many surgical terms commonly used. Purity of language should be aimed at by all who wish to write correctly and this is all important in scientific language. Therefore this dictionary will be especially helpful to all medical authors.

What matter to admit in a dictionary and how it should be arranged (set up in type) are largely questions to be left to the editor's taste. Much is to be said in favor of the arrangement adopted by Dr. Stedman but as to the introduction of chemical terms and signs there may well be a difference of opinion. By admitting these Dr. Stedman has made his dictionary more complete than any other. His use of the Basle Anatomical Nomenclature is but another proof of the really scientific quality of the work. The proper selection of illustrations for any dictionary is always a puzzle but those found in this one may be said to be as satisfactory as in any.

The publishers as well as Dr. Stedman are to be congratulated in this new dictionary, which all medical writers will be glad to possess. The make-up of the volume is pleasing; the paper is good, the type excellent both in size and distinctness, so that with admirable spacing the use of the dictionary is made a pleasure.

Diseases of the Genito-Urinary Organs. By EDWARD L. KEYES, JR., M. D., Ph. D. Price, $6.00. (*New York: D. Appleton & Co., 1910.*)

This work of Keyes is probably one of the best that has so far been published for the general use of the student. The subject is dealt with clearly and concisely, yet at the same time thoroughly. The illustrations, which are found in profusion, are for the most part very good. The text is well written and makes very interesting reading.

The author has adapted the theory of Ciechanowski concerning the etiology of prostatic hypertrophy. This very attractive theory, which holds that chronic prostatitis is the direct cause of hypertrophy has, however, very little to support it from a statistical or pathological standpoint.

The value of the book is materially enhanced by the chapters on syphilis.

The volume as a whole is replete with practical information, and will prove to be a useful and valuable guide, not only to the general practitioner and student, but also to the specialist.

Prevention of Infectious Diseases. By ALVAH H. DOTY, M. D., Health Officer of the Port of New York. (*New York and London: D. Appleton & Co., 1911.*)

This little book of less than 300 pages is a valuable addition to the literature dealing with infectious diseases, expressing as it does the point of view of a health officer with many years' experience in this field. Such diseases as smallpox, yellow fever, typhus fever, plague and cholera are presented in detail from the sanitary standpoint, and the proper preventive measures to be employed in these diseases emphasized. The older theories which seek to account for the spread of infectious diseases by fomites, are contrasted with the newer theories in which the rôle of insects and bacillus carriers occupy a position of primary importance. The author is somewhat dogmatic in his treatment of the subject, frequently expressing his personal individual opinion without giving his readers the facts and observations upon which his opinions are based. There is but little citation of authority, and a frequent and unnecessary repetition of statements of general import. The subjects of disinfection and disinfectants are particularly well handled. Despite a rather obstruse style and a general, rather than a special discussion of the subject-matter, the book may be recommended to medical students interested in preventive medicine.

Die Faeces des Säuglings und des Kindes. Die Bedeutung Und Technik Ihrer Untersuchung. Von Dr. Adolf F. Hecht. Price, Mk. 8. (*Berlin und Wien: Urban & Schwarzenberg, 1910.*)

This monograph on the feces of infants and children treats in an exhaustive manner the composition of the feces in the norm and under pathological conditions, noting the significance of the result obtained thus far. The methods of the examination of the feces are given in such a manner as to render the book very valuable for workers in this field. The book is not only of value to the pediatrician but will be welcomed by the student of nutrition.

S. A.

A Text-book of Bacteriology: A Practical Treatise for Students and Practitioners of Medicine. By Philip Hanson Hiss, Jr., M. D., Professor of Bacteriology, College of Physicians and Surgeons, Columbia University, New York City, and Hans Zinsser, M. D., Professor of Bacteriology, Leland Stanford, Jr., University, Palo Alto, California. (*New York and London: D. Appleton & Co., 1910.*)

The appearance of a new text-book in any subject relating to the medical sciences is not usually a matter for congratulation, but the publication of a new treatise on bacteriology in 1910 by Dr. P. H. Hiss, Jr., Professor of Bacteriology in the Columbia University, New York, and Dr. Hans Zinsser, now Professor of Bacteriology in Leland Stanford, Jr., University, may be regarded in an entirely different light. In addition to a number of fairly mediocre text-books in this field which the American medical students have had to rely upon for some years, two publications of surpassing value have appeared within a comparatively short time, one the careful painstaking American edition of Muir and Ritchie by Harris, and the other the General Text-book of Bacteriology by E. O. Jordan, of the University of Chicago. Both of these books have been highly recommended to the readers of the Bulletin. Hiss and Zinsser's work is thus the third of the really first-class books on this subject in English. It is far more comprehensive in its scope than either of those previously mentioned, and the reputation of its authors for scientific investigation of the highest character is at once a guarantee of the excellence of the work. We have now been able to utilize this text-book in teaching two classes in bacteriology and our experience in its use has only fulfilled the highest expectations formed originally. Throughout the whole volume a strong conservative tone is manifest. Facts are not accepted without due evidence, doubt is always expressed when the opportunity for doubt exists, and allowance is always made for the various interpretations which can be drawn from reported observations.

The book consists of over 700 pages divided into 54 chapters. These chapters are grouped under five different sections. Section
I deals with the General Biology of Bacteria and the
of Bacteriological Study, Section II with Infection and
Section III with Pathogenic Microorganisms, Section
Diseases of Unknown Etiology, and Section V with
Air, Soil, Water and Milk. In the first section the
of the subject is well presented but possibly too
work so pretentious as this and in our opinion the
fundamental value of Koch's early work on bacteria
properly indicated. It was Koch's work on anthrax in
began a new era in bacteriology, and his discovery
tubercle bacillus and the cholera vibrio that directed
tion of the medical public to this field. The chapters
to the biological activities of bacteria are clearly
in those dealing with microscopic study and staining
and with the preparation of cultural media, there is a
of detail gratifying alike to instructor and student.

In Section II on Infection and Immunity nearly one
and fifty pages are devoted to the subject and
phase of it is considered. Toxins, antitoxins, lysins,
precipitins, opsonins, aggressins, and anaphylaxis are
sidered in detail. The theories of immunity are
great clarity and are not too much amplified. Especial
is laid upon the technique of serum reactions,
presented in text-books and upon the practical
facts and problems of immunity upon the science of

Section III is devoted to the Pathogenic
which affect man. They are described with great
the lesions with which they are associated in man and
they produce in animals are carefully portrayed.
be praised is the description of the cultural reactions
organisms as the pneumococcus and streptococcus, the
bacillus and the dysentery bacillus. In this section the
have made no particular attempt to apply correct
names. This may be regarded as an unwise procedure
scientific standpoint, but possibly justified in a
ten primarily for students of medicine. The chapter
leprosy bacillus was evidently prepared before the work
organism by Clegg in the Philippine Islands and
Orleans, although the book apparently went to press
important investigations of these authors had come
This is extremely unfortunate since it renders a
vision of this chapter necessary and fails in its
to give any credit to investigators who have succeeded
vating organisms which have defied the attempts of
foremost men in the field of bacteriology. Another
of American workers, the solution of the etiology of hog
is not presented, but this may be excused on the plea
text-book is devoted to the organisms which infect
value of this work, however, and the relation of the fact
out by Dorset, McBride and Bolton, that hog cholera
a filterable virus, to problems of infection in man and
general subject of immunity, might have been made
for reporting in detail what we must regard as one of the
est contributions of American bacteriologists.

In Section IV, devoted to Diseases of Unknown
Section V, on Bacteria in Air, Soil, Water and Milk,
points of importance in this connection are presented
and concisely.

The book is highly to be commended both to the
student and the practicing physician. From the
the instructor it satisfies a need long felt in teaching
ject of bacteriology, and will, we believe, become
most popular text-books on this subject.

W. W.

The Johns Hopkins Hospital Bulletins are issued monthly. They are printed by the LORD BALTIMORE PRESS, Baltimore. Subscri
a year (foreign postage, 50 cents), may be addressed to the publishers, THE JOHNS HOPKINS PRESS, BALTIMORE; single copies will be
mail for twenty-five cents each. Single copies may also be procured from the BALTIMORE NEWS CO., Baltimore.

BULLETIN

OF

HE JOHNS HOPKINS HOSPITAL

Entered as Second-Class Matter at the Baltimore, Maryland, Postoffice. V. 22

XII.—No. 250.] BALTIMORE, DECEMBER, 1911. [Price, 25 Cents

CONTENTS.

PAGE

and Work of Robert Koch.
WILLIAM W. FORD, M. D., D. P. H. 415

och. (December 11, 1843–May 27, 1910.) The Father of
lodern Science of Tuberculosis. (Illustrated.)
S. ADOLPHUS KNOPF, M. D. 425

The Blood Picture in Tuberculosis. (Illustrated.)
By MARGARET REED LEWIS 428

Notes on New Books 434

Books Received 439

Index 441

THE LIFE AND WORK OF ROBERT KOCH.

By WILLIAM W. FORD, M. D., D. P. H.,

Associate Professor of Hygiene and Bacteriology, The Johns Hopkins University.

Ehrlich, possibly the greatest mind in modern medical y, certainly the most prolific investigator in those Medical Science in which his path has lain, said when ed that our entire knowledge of the infectious diseases various related branches of learning rests upon the ons which he established; that he devised the methods ave science the posibility of solving the problems in y on an exact experimental basis, the problems of y which Pasteur for the first time freed from the con- pure empiricism: and that even in the realm of ex- al therapy Koch holds the first place, since he taught 1 how to transmit the infectious diseases artificially mal to animal, thus enabling us to apply therapeutic experimentally.

raise by Ehrlich seems at first an extravagant tribute ition for a devoted friend and an honored colleague; we remember that every well-trained physician and the present generation uses in his daily work the which came from the investigations of Koch; that erly organized medical school and hospital has a founded on the methods which Koch devised and tus which he invented; that every municipality in gainst the great pestilences of the world, cholera, , typhoid fever, diphtheria, and in the efforts to its citizens milk, water, and food which cannot e vehicle of infection, depends for its preventive on the doctrines which Koch proved; when we re- ll modern bacteriology has been made possible by the discoveries of Robert Koch, then we are minded to regard Ehrlich's tribute as expressing even less than the truth.

Let us inquire into the circumstances of Koch's life and study for a moment his early publications to try and determine why he occupies such a pre-eminent place in medical science. Robert Koch was born in Klausthal in the province of Hanover on December 11, 1843. According to Gaffky, who has given us the most intimate account of his teacher and predecessor at the *Institut für Infecktions-Krankheiten,* Koch's family had lived in Klausthal for a number of generations, and had been for some years in the employ of the government. His father was a man of considerable scientific attainment, whose reputation spread beyond the little district in which his activities were centered, and who was honored by the Prussian government with the title of *Bergrath,* or as we may say expert mining engineer. Koch himself was one of thirteen children, two daughters and eleven sons. Two brothers dying in infancy left him among the eldest of the sons. His mother was a hard-working woman, whose domestic cares and responsibilities prevented her from devoting much attention to the rearing of her numerous progeny, and his father from the nature of his work was compelled to absent himself from the home for much of his time. Koch was thus left to grow up in a crowd of wild and untrained boys. He attended the Klausthal Gymnasium, in which, contemporary accounts tell us, the instruction was poor and discipline lax. He took an active part in the school life, was an excellent athlete, was a member of a school society known as Concordia, and sang, but without great success, in a choral union, or as we would express it, was a member of the Glee Club. During his school life his chief outside occupation was with his father, whom he accompanied on long rides and walks over the hills and valleys of the surrounding Harz country. He early showed a passion for natural science and made numerous collections of minerals, plants, and small animals. His reading along the lines of geology, zoölogy and botany was extensive and during his entire life and work he kept up this active interest in the branches of learning collateral to the science of medicine. Koch thus enjoyed in his early youth the free out-door life of a boy brought up in the country, developing a rugged physique and great powers of endurance.

He was intended by his father for a merchant, the rapidly growing commercial cities of northern Germany like Hamburg and Bremen with their world-wide commerce offering the sons of Government officials peculiar advantages for a practical career. About the year 1860, however, the worldly condition of the father was greatly improved—we do not know the exact source of this enhancement of income—and he was enabled to offer the son a University training. We thus find Koch in 1862 leaving the Klausthal Gymnasium, wending his way to Göttingen and entering upon the study of medicine. His idea at that time seems to have been to train himself to be a ship-surgeon.

At the time Koch entered the University of Göttingen the faculty there included a number of men who left their marks on science. The senior among them was the chemist Friedrich Woehler, who in 1828 had accomplished the synthesis of urea. Others were the pathologist Wilhelm Krause and the physiologist George Meissner. By far the most important man in Göttingen, however, was the anatomist Jacob Henle, whose scientific work and mental grasp were so wide that his writings covered the field of physiology and pathology as well as anatomy. It is interesting and important to note that Koch came into intimate relationship with Henle, who evidently made a strong impression upon him.

In the year 1865, the medical faculty offered a prize for the best dissertation upon the structure of the uterine nerves. In the competition which resulted, two prizes were awarded, one to Robert Koch for a thesis which bore the title *Ueber das Vorkommen von Ganglienzellen an den Nerven des Uterus* and was inscribed with the Latin motto, *Nunquam otiosus;* a second prize going to a fellow-landsman of Koch's, Adolf Polle. Four weeks later, on July 18, 1865, Koch was appointed assistant in the Pathological Museum of which Krause was the director. This appointment offered him the opportunity of acquiring a thorough training in pathological and microscopical technique, a training which gave him afterwards the ability to guide his early footsteps groping in the dark maze of microorganisms by the true light of pathological anatomy. At the same time that Koch served as assistant in pathology he was engaged in original work in the Physiological Institute under the direction of Meissner. He made a study of the excretion of succinic acid in animals fed exclusively on meat and [illegible] was unwilling to limit his observations to the lower animals but endeavored to work out the problem by [illegible] himself the subject of experimentation. He ate half a [illegible] of butter daily and estimated his output of succinic acid. [illegible] fortunately he undertook these experiments in the hot [illegible] summer and after five administrations of this fat-rich [illegible] his stomach revolted, he developed a violent attack of [illegible] catarrh and was compelled to finish his work upon the [illegible]sitive animals.

In January, 1866, Koch finished his academic career, [illegible] the *examen rigorosum* with the mark *eximia cum* [illegible] three days later was given his doctor's degree on which [illegible]sion he delivered in Latin an address on the subject "S[illegible] Acid in the Human Body." Owing probably to his [illegible] thesis on the ganglion cells of the uterus, he was not [illegible] to present a thesis on taking his degree. In March of th[illegible] year Koch passed the state examination in Hanover, [illegible] spent the intervening time in postgraduate study in Berli[illegible] then became an assistant in the General Hospital in Ha[illegible] for a short term of three months and in October took [illegible] as physician to the Asylum for Idiots in Langenhagen [illegible] the city of Hanover, where he remained until July, 18[illegible] practiced for a short time in the little town of Niemeg[illegible] 1869 moved to Rakwitz in the Province of Posen. Fr[illegible] witz he enlisted as a surgeon in the Franco-Prussian W[illegible] after his return in 1872 secured the position of *Kreis*[illegible] or district physician in the town of Wollstein.

Here in Wollstein Koch remained for years busily [illegible] in a general country practice of medicine. He was [illegible] to take long rides over rough country roads by day [illegible] night, and minister to the needs of a people in the [illegible] circumstances. He was out of touch with University [illegible] which he loved. He was outside the circle of intelle[illegible]tivity, the stimulus to great endeavor. And yet from [illegible] of Koch's arrival in Wollstein, we know that he occupied [illegible]self unceasingly in attempts to solve the most impor[illegible]tions in medicine of his day and generation. We know [illegible] fitted up for himself a laboratory, setting aside a p[illegible] his consulting room for this purpose. We know th[illegible]mediately after his arrival there he purchased a new [illegible]scope and a microtome and that in his improvised la[illegible] he installed a piece of apparatus, the use of which [illegible] learned in the Physiological Institute at Göttingen, an [illegible]tor or thermostat which could be kept at the body temp[illegible] We know that Koch devoted all his spare time to the st[illegible] disease of animals widely spread in the district where [illegible] anthrax or splenic fever, and that he carried out all [illegible] experiments in his study of this disease. We do not k[illegible] Koch did not lapse into the respectable mediocrity w[illegible] position in life and his professional attainments made [illegible] the line of least resistance. Something of his youth, [illegible] chief pleasure was the amateur collection and dis[illegible] plants and animals, something of the influences with [illegible] was surrounded in the years at Göttingen, possibly th[illegible]tion of his teacher and master Henle, something it [illegible] kept Robert Koch from degenerating. Somethin[illegible] spare hours which he could snatch from cting duties of a country practice. During the first ars of this period Koch seems to have said nothing of k and only in the year 1876 when he was thirty-three ld, and ten years after his graduation from Göttingen inkling of his results reach the scientific world.

nderstand the significance of Koch's first publication t glance for a moment at the bacteriological work which d it. For 100 years after the discovery of the micro- y Athanasius Kircher and the improvement in lenses uwenhoek, which revealed to the astonished eye the ss structures belonging to a finer world, the attention of gators was centered upon these minute bodies and specu- vas rife as to the possible rôle they might play in nature. fused were the ideas of scientists, nevertheless, and so g were the findings of the microscope that the great t Linnæus grouped all the microscopic living forms ne division which he named "chaos." Gradually, how- ore and more definite conclusions could be drawn from ny observations. Plenciz, for instance, in an accurate of the symptoms of disease brought forward convinc- uments for the doctrine of "contagium vivum." Spal- and later Schultze pointed out that the development g organisms was the cause of putrefaction and Müller renberg by exact morphological studies demonstrated stence of constant differences in the various bodies seen e microscope. The year 1837 was especially fruitful in tions of permanent scientific value. In this year Donné d for the first time living microorganisms in patholog- ditions. In pus from a syphilitic chancre he found forms which he termed vibrios, and with material con- these vibrios he inoculated the skin of the thigh in his patients. On the following day he noted the ap- of a typical pustule containing a sero-purulent fluid vibrios like the original were to be found. Despite that Donné obtained these vibrios from cases of typical and showed that they contained infectious material, not convinced that they were the cause of the disease. , in 1844, he announced that the vibrios previously e in all probability accidentally present on the surface ancre. In the year 1837 also Cagniard-Latour and each made independently the observation that the und bodies first found by Leeuwenhoek in beer and ld be seen to increase and multiply step by step as the tion of the beer and wine advanced. They suggested e bodies were minute plants and the cause of the fer- n, Turpin later giving them the name *Torula cere-* he idea that disease and fermentation were similar was by no means new to medicine and if the one to the growth of microorganisms, the other might e to this factor. In the year 1837, we thus have the formulation of the germ theory of disease which n any definite observations. This year also saw the by Bassi that muscardine, the contagious disease of gave instant confirmation to the theories of Latour and Schwann. Soon all sorts of microscopic forms were described in diseased conditions and their etiological relationship to these conditions accepted without question, but the resulting confusion was so great and the bar to further progress so strong that Jacob Henle, then a Privat-docent in the University of Berlin, was stimulated to challenge the claims of the many investigators who attributed disease to bacteria. In 1840 in his *Pathologische Untersuchungen,* in an essay entitled *Von den Miasmen und Contagien und von den miasmatisch-contagiösen Krankheiten,* he called attention to the various conditions which had to be established in order to show that bacteria were the cause of disease. "Before microscopic forms," said Henle, "can be regarded as the cause of contagion in man they must be found constantly in the contagious material, they must be isolated from it and their strength tested." The postulates of Henle seem so near the truth as we see it today, that we are apt to transfer them directly from the science of 1840 to the science of 1900, forgetting that the state of knowledge at the time Henle wrote could give him no adequate conception of the morphological and physiological properties of bacteria as at present understood.

Nevertheless the rigid proof demanded by Henle, made the most profound impression upon the thought of his day. The wild and reckless speculation ceased. Fortunately the work went on and the observations continued. During the next decade a host of parasites was described, many of them belonging, we now know, to the higher fungi, and to this period we owe such terms as oïdium, aspergillus, trichophyton, and leptothrix.

In the year 1857 Pasteur following the lead of Spallanzani and Schultze, by his demonstration of the special resistance to heat of certain bacterial structures which we now recognize as spores, dispelled from the world the fascinating doctrine of spontaneous generation. He next showed that as Latour and Schwann had taught for beer and wine, the fermentation which resulted in lactic, acetic, and butyric acid was also occasioned by microorganisms which differed from each other in morphological and biological characteristics and that the diseases of wine and beer were accompanied by other forms than those found under normal conditions. He thus established on a firm basis the doctrine of the existence of definite kinds of microorganisms having definite physiological properties. Pasteur, however, was interested largely in the study of microscopic organisms in bulk, and in determining the effects brought about by the development of these organisms under different conditions. He had little or no interest in morphological studies and the necessity of obtaining pure cultures and of studying the action of isolated species apparently was not clearly faced by him.

These observations upon fermentation were confirmed almost at once, but in an indirect way, by the apothecary Lemaire who for years had busied himself with the study of carbolic acid. Lemaire showed that the addition of minute traces of this acid to fluids fermenting from the development of microorganisms stopped this action while the addition of the same material to solutions containing diastase or similar substances was without effect. The carbolic, according to Lemaire, inhibited the development of the living plants but could not stop the chemical changes superinduced by the presence of the true ferments. The importance of this observation did not escape Lemaire, who suggested that the suppuration of wounds might be prevented also by the addition of carbolic acid, if the suppuration were really due to living parasites. Shortly after, the brilliant young English surgeon, Joseph Lister, thoroughly imbued with Pasteur's ideas on fermentation and its relation to disease, began his wonderful experiments upon the healing of wounds. He seems to have been unfamiliar with Lemaire's observations, gaining his first idea as to the efficacy of carbolic acid in the destruction of microorganisms from the work which was done with this acid in the disposal of sewage near the little town of Carlisle. The observations of Lister, by means of which he developed his antiseptic technique, form one of the great chapters in surgery as well as in bacteriology and we all know how far-reaching the influence of this work has been. Lister was actuated in his experiments, however, mainly by the idea that the poisonous germs were in the air and that their access to the wounds must be prevented, a point of view which we now recognize to have been based upon insufficient knowledge as to the etiology of infections. At no time did he offer any evidence to show that a definite pathological condition was due to the development of a particular bacterial species.

The first observation of a characteristic microorganism in a definite disease is apparently that of Pollender, who, in 1849, found the bacillus of anthrax in the blood of an animal dead of splenic fever. The following year this was confirmed by Davaine, and in the decade from 1850-1860 the presence of these organisms in anthrax blood was testified to by a number of observers. In the year 1860 Delafond found the parasite not only in affected cattle but also in the blood of animals inoculated with material taken from the natural disease, and three years later Davaine, impressed by the work of Pasteur on fermentation, carried out still more convincing experiments. Side by side he inoculated animals with blood containing the bacteria and blood free from them, observing the development of anthrax only in those animals which had received the material containing the organism. Nevertheless, in all these experiments, some virus in the blood and not the organisms visible under the microscope might be the cause of the disease. The proof that the bacteria seen first by Pollender and Davaine were the infectious agent of splenic fever had not yet been brought and could not be brought until the organism was cultivated artificially outside the animal body, and successful inoculations carried out with such a culture freed from any virus or poison.

The first attempt to devise a method for the separation of microorganisms from mixtures is probably seen in the ex- nts of Hallier in 1866. His apparatus, however, did not permit the isolation of individual species, and
different kinds of organisms appeared that Hallier
the doctrine of *pleomorphism,* the doctrine that micro
isms could change their size and shape, developing
another. Faulty as was the method of Hallier and
were his conclusions, he nevertheless again drew atten
the occurence of bacteria in various pathological condi
in measles, syphilis, gonorrhœa, glanders and diphtheria
presence of bacteria in morbid processes was about
further demonstrated by some of the most reliable inv
tors of the day, among whom must be mentioned
Cohn, Oertel, Eberth, Klebs, Rindfleisch, von Reckling
and Waldeyer. In most of the observations at this tim
ever, various cells, cellular detritus of organic and in
nature, particles of fat and different crystals were
together as living organisms. In 1871 von Reckling
found, in the organs and tissues of individuals dead of
puerperal fever, typhoid fever, and rheumatism, small
with a definite structure which were not dissolved by
by acetic acid or by glycerine. Such bodies were cla
ganic in nature. During the same year Waldeyer demon
aggregations of minute forms which were evidently
in the heart muscle in pyæmia and in the pelvis of the
in pyelonephritis, and a little later Weigert found bodi
the reaction described by von Recklinghausen in the
cases of hemorrhagic smallpox. Klebs also in 1870-
scribed his *microsporon septicum* in gun-shot wo
granulation tissue, in fistulæ, in diseased bone-marr
cartilages of the joints in arthritis, and in diphther
devised methods for the isolation of organisms in pure
the so-called fractional cultivation, but had no succe
observations of so many competent observers that bac
constantly present in diseased conditions coupled with
ure to demonstrate organisms in the normal tissues,
be explained on the theory that they were the cau
pathological change. The whole question was involved
obscurity, however, since no proof had been brought
particular variety of organism seen with the micro
derived from a previously existing organism of the
and shape and with the same properties. The obs
rendered more dense moreover by the contentions
servers as Bilroth and Klebs, that the same micr
could be the cause of the most diverse pathological
pyæmia, septicæmia, puerperal fever, phthisis, small
theria, and cholera. The etiology of infections coul
cleared up by the demonstration of specific differen
many bacterial forms found in diseased organs and

About this time the Botanical Institute of Ferdi
in Breslau became the seat of active and illuminati
gations upon microorganisms. The *Monas prodi*
previously been discovered in a red discoloration
Ehrenberg and its cultivation accomplished by Fre
Erdmann on potato. The pigment produced by this
enabled the observer to follow the growth from ge
generation, and cast aside as contaminations all th

r of media in Cohn's Institute. He was unable to sepa-
ıixtures of organisms into their constituent elements.
er, and in consequence could not be sure his colonies
t contain extraneous species having the same morphology
microorganism which produced the pigment. The cry-
cessity was for a method which would bring about the
tion of one organism from another and enable the ob-
to test the properties of isolated species. No one ap-
:ed this necessity more than Cohn himself, who clearly
at until the different bacteria could be isolated, in pure
e, and observed over long periods of time, no certainty
xist as to the origin of any one particular organism from
xisting organism of the same size and shape. Neverthe-
ı the ground of the various investigations relating to the
ology and the physiological properties of bacteria, Cohn
ıoroughly convinced of the correctness of the doctrine
ifferent species of microorganisms existed in nature,
ıg from each other in form, in biological reactions, and
mentative activity. The proof for this thesis, which
regarded as the key-note to the whole science of bac-
gy, had not yet been brought. Cohn had himself dis-
l the sporulation in the bacilli and had predicted that
would be found in the organism of splenic fever. As
self tells us, he was greatly delighted to receive a letter on
22, 1876, from a young country physician in Wollstein,
Koch, stating that he had succeeded in working out the
te life-history of the anthrax bacillus and that the na-
ıd distribution of the disease could be fully explained by
de in which the organisms developed and especially by
porulation, the sporulation which Cohn had predicted
hich he himself had observed under the microscope.
xpressed his willingness to carry out the necessary ex-
ıts to prove these claims in Cohn's own Institute and his
o obtain Cohn's judgment of their value. Cohn at once
Koch to come to Breslau and on April 30, 1876, Koch,
three-day demonstration before Cohn in the Botanical
e. He brought with him many of his preparations and
out a number of fundamental experiments. He showed
ow he could cultivate the anthrax bacillus in sterile
erum or in the aqueous humor of a bullock's eyes, and
vent through a definite phase of development. During
se of this development the short rods originally present
lood of animals dead of splenic fever grew out into long
or chains of bacilli in each of which a spore appeared.
pores became free from the organisms which disinte-
nd disappeared, and under proper conditions of tem-
and moisture underwent certain peculiar changes. As
of these changes, projecting from each spore there
the short rod, characteristic of the bacillus of anthrax
ed in the blood of infected animals. Thus the com-
e cycle of the anthrax bacillus was established, the
plete life cycle to be described for any of the bacteria.
rther showed Cohn how the inoculation of animals

ployed contained the bacillus or its spores, and only under these conditions, actually inoculating frogs, mice, and rabbits with infectious material in Cohn's presence. He finally proved to Cohn that the nature and the distribution of the disease could be amply explained by the facts which he had brought to light in regard to the life history of the anthrax bacillus. This demonstration took place in the presence of a number of professors in the University of Breslau besides Cohn, notably the physiologist Leopold Auerbach, the pathologist Julius Cohnheim and his assistant Karl Weigert, and Messrs. Eidam, Lichtheim and Traube. It is said that Cohnheim was so astonished and delighted by Koch and his work that he rushed back to the Pathological Institute, called his assistants together and told them to stop their work and hasten to the Botanical Laboratory where they could see the demonstration for themselves. He said Koch had made a startling discovery which in the simplicity and exactness of the methods employed was the more to be wondered at since he was shut off in his life from all scientific intercourse, and yet everything he had done was absolutely original and absolutely complete. "It leaves nothing more to be proved," said Cohnheim. "I regard it as the greatest discovery that has ever been made with bacteria, and I believe that this is not the first time that this young Robert Koch will surprise and shame us by the brilliancy of his investigations." *

The work on anthrax was published almost immediately in Cohn's *Beiträge zur Biologie der Pflanzen* in July, 1876. In a paper of over forty pages Koch describes with great exactness the many experiments he had conducted with the organisms of splenic fever, the methods he had employed and the conclusions which could be drawn from his work. Not only was the sporulation of the anthrax bacillus proven and its life cycle worked out, but for the first time in the history of bacteriology a pathogenic microorganism was cultivated artificially in pure culture outside the animal body and the specific disease produced. This Koch accomplished by the use of hanging drops of aqueous humor or sterile blood serum placed over hollow-ground slides. In these preparations he watched the development of the organisms for a number of generations throwing out as contaminations all those preparations which showed anything besides the characteristic bacillus or its spores. He made a careful study of the natural disease in cattle, sheep and horses, and produced the disease artificially in mice, guinea pigs, and rabbits by inoculation with blood or with splenic pulp from infected animals. He now produced the same disease in these animals by the use of his pure cultures grown for a number of generations outside the body. He thus settled absolutely the etiological relationship of the bacillus of anthrax to the disease and answered the arguments of those who maintained that some virus or poison in the blood and not the organisms of Pollender and Davaine were the infectious agent. In addition to his production of anthrax in mice, guinea pigs and rabbits, Koch inoculated dogs and two varieties of birds, namely, partridges and sparrows and noted their resistance to infection. The same insusceptibility he found also in frogs and in his examination of the tissues of these animals, called attention to the remarkable fact that the anthrax bacilli were ingested by the white corpuscles of the blood. A similar ingestion of the organisms by blood cells he notes in material taken from the spleen of a horse dead of anthrax.

---

* Dr. W. H. Welch was working in Cohnheim's laboratory at this time and states that Cohnheim's enthusiasm over Koch's discovery made a profound impression upon all the men in the Pathological Institute.

This paper is one of the great classics in bacteriology. By it the first clear light was thrown upon the dim obscurity which enveloped the world of microorganisms. By it the path was first shown along which the growth of this science was to move. It is significant that in the thirty-five years which have passed since the publication of this first paper of Koch's on anthrax, the world-wide development of bacteriology has not thrown doubt upon the accuracy of Koch's observations, nor disproved any of the conclusions which he drew. Indeed but little of importance has been added to the facts which Koch established concerning the life history of the anthrax bacillus and the etiology of splenic fever. In November of the following year, 1877, Koch published his second paper. Here he described his method for making films of bacteria on the surface of coverslips, fixing them by drying or gentle heat, and his application of Weigert's use of the aniline dyes for the demonstration of bacteria in tissues, to the study of these bacterial films. In addition to the method of staining the bodies of the bacterial cells Koch also devised a method for staining the flagella on some of the motile forms. Cilia had previously been seen on bacteria, but now for the first time satisfactory proof of their existence was brought. The bulk of this paper, however, is given up to the subject of the photography of bacteria, in which Koch was keenly interested because of his belief that only by carefully prepared photographs could different observers compare their findings and avoid the many erroneous impressions resulting from imperfect descriptions of microscopic forms.

The work on anthrax was accepted everywhere in Germany, but met with much opposition in France at the hands of the physiologist Paul Bert. Bert maintained that every disease must be caused by a virus of the nature of an organized ferment whose activity was inhibited by oxygen. Since the anthrax bacillus could develop in the presence of oxygen, it could not be the virus which produced the disease. Bert's opposition to Koch's conclusions led the great Pasteur into the study of anthrax and into the field of infectious diseases, where as he himself said at the time "he had thus far been a stranger." Pasteur confirmed all of Koch's observations and completely overwhelmed Bert with the force of his arguments.

The study of anthrax, however, started Pasteur upon the study of other infectious conditions and in the course of his experiments he found an organism which was the cause of a mia in animals, to which he gave the name *vibrion* The septicæmia produced by the *vibrion septique* was entirely different from the septicæmia produced b ganism of splenic fever. As a result of Pasteur's anthrax and on the septicæmia due to his *vibrion sep* mind was again turned to the relation between fer and disease and we find him on April 30, 1878, in colla with Joubert and Chamberland advocating publicl doctrine of the dependence of disease upon the gr microorganisms within the body. Even before th however, Koch had been putting this theory to a prac studying with great minuteness the various effects wh produced in animals by inoculation with all sorts material. The results obtained by Koch were also p in 1878 in a paper entitled, *Untersuchungen über ologie der Wundinfektionskrankheiten,* which consti third of his important publications. In this paper K forward clearly the exact state of knowledge on the of surgical infections; he explains the difficulties whic be overcome in working out their etiology and describe sults which others before him had achieved. He th that he determined to study especially analogous cond animals resulting from the subcutaneous introductio terial from various sources. He tells how he succeede ficially producing conditions which were strictly comp surgical wound infections and how these infections were always due to microorganisms. He reports six kinds of infection so produced, pictures the organis ciated with each, describes in detail the appearances gans and tissues of the infected animals. He notes that certain species are susceptible to one kind of micr ism, other species to other kinds, points out that th body itself is the very best medium in which to obta *cultures* and that the pure cultures so obtained ca alive by the continuous inoculation of fresh anima greater proof that infectious material consists of kinds of living microorganisms capable of indefin plication could be asked, except the cultivation of th isms in pure culture outside the animal body and duction of the lesions by the organisms themselv proof had already been furnished by Koch for anthr eral improvements in bacteriological technique were scribed by Koch in this paper, the most important adoption of the oil-immersion lens of Stephenson Abbe condenser for the study of microscopic forms.

Koch's growing reputation prevented his longer st Wollstein and the impression which his experiments sonality had made on Ferdinand Cohn and the oth Breslau led them to procure a place for him there as *arzt* or Municipal Physician. In the summer of 18 moved his family to Breslau and took up the work o position. The strenuous life of a city practition little to Koch's liking, the salary of the new positio below that required for himself and his family an too he found that his scientific work was interfered any rate after three months sojourn in Breslau he r steps to Wollstein where his old place was still u the community. About this time Finkelnberg, one of iembers of the *Gesundheitsamt* in Berlin, resigned to t a professorship and Koch, largely through the instru- ility of Cohnheim, was selected as his successor. He l his family to Berlin and from this time on devoted him- clusively to laboratory work. At the time he entered the *dheitsamt* bacteriological investigation, which had pre- y been carried out there with some zeal, was largely oned. With characteristic energy Koch gathered about lf a number of assistants and students and with their improved and applied the methods and technique which eviously had devised. At the end of the first year the rations were published in the *Mittheilungen aus dem lichen Gesundheitsamte* for 1881. In this volume g other articles were three papers by Koch alone, one by and Wolfhügel and one by Koch, Gaffky and Loeffler, ntributions of the greatest importance to the now rapidly ping science of bacteriology. Many of the methods for zation and disinfection which are now in vogue were d at this time and many great improvements in bacterio- l technique were introduced. In the first paper in this e Koch described what we must regard as his greatest ement, his poured-plate method for the isolation of or- ms in pure culture. Up to this time no method had ever devised for obtaining pure cultures of organisms from res. We know that Koch had pure cultures of the ax bacillus, for in this work he first obtained the organ- from the blood of an infected animal, using the greatest ations to prevent contamination, and employing carefully zed instruments, sterilized slides and coverslips. In on he actually watched the development of the bacteria the microscope, casting aside as worthless any prepara- which showed extraneous organisms and controlling his by constantly producing the disease by inoculation. We also that he recognized the value of the animal body as a m in which to obtain pure cultures of bacteria and in rk on wound infections showed how one organism would p exclusively in one animal, another organism in another. vas entirely a different matter, however, from obtaining ultures from mixtures. No scheme had yet been hit no apparatus had been invented by means of which this be accomplished. Attempts to solve the problem had ountless and the difficulty of solving it is apparent when recalled that such skillful investigators as Hallier, Lister, Naegeli, Salamonson and Buchner had all de- pparatus and methods for this purpose, but had failed t with success. Koch in order to obtain pure cultures use of nutrient gelatin. This material had previously mployed in the cultivation of microorganisms, but solutions so dilute as not to harden and furnish the ansparent medium Koch desired for the study of his s. Koch now used the gelatin in such proportions as to solid coagulum when cooled, and added to this gelatin

necessary for their nutrition. In his previous work Koch had observed that if a slice of potato was sterilized by cooking and kept under aseptic precautions in closed and sterilized vessels, no growth of any sort or description appeared upon the cut surface. If a similar slice of potato was exposed to the air for a few minutes and then put in a warm chamber, after a few days its surface was covered by colonies of various colors, which when examined microscopically were found to be made up each of its own kind of microorganism. Acting upon this idea Koch spread his newly devised gelatin upon the surface of sterile glass slides or dishes and inoculated the surface by drawing over it a platinum wire which after sterilization had been immersed in the mixture of bacteria to be studied. He now found that isolated colonies developed along the line of these streaks and that these colonies were each composed of but one kind of microorganism. He next further improved this method by inoculating the melted gelatin directly, shaking it well to get a separation of the individual cells and pouring this over the surface of a sterilized glass dish. This method of making streak cultures and of pouring plates gave pure cultures and solved the problem which had been attempted by so many of his predecessors, the problem which the scientific world recognized had to be solved before the science of bacteriology could advance very far beyond the place where it had rested for so many years.

Simple as the poured-plate method appears to us at the present time and clear as are the various steps taken by Koch in the solution of the difficulty, it still remains to us the only practical procedure for obtaining pure cultures of microorganisms, the slight modifications which it has undergone in the quarter of a century since its discovery relating largely to the composition of the medium which is employed. For us in America it is interesting to note that the only real improvement over Koch's poured-plate method came from the hands of an American investigator, Professor Barbour, who has devised an ingenious apparatus by means of which he can obtain cultures from isolated bacterial cells. From the difficulty of using this method, however, it can have but a limited application in bacteriology.

The end of the year 1881 may be said to mark the close of the inventive or constructive period in Koch's life. In the decade from 1872, when he returned from the Franco-Prussian war, to the year 1882 the science of bacteriology had changed from a chaos of conflicting views and observations to a well ordered system. The methods for fixing and staining bacteria so as to make their microscopic study possible had been devised, their cilia had been stained, the oil-immersion lens and the Abbe condenser had been utilized, a method of separating single species from mixtures had been found, the pathogenic bacteria had been cultivated in pure culture, the etiology of infections had been cleared up, the germ theory of disease had become a proven doctrine. For most of this advance in knowledge Koch was himself responsible.

From this time on the work of Koch and his pupils was largely the application of the methods already perfected to the study of other conditions and the next few years were rife with epoch-making discoveries in the field of infectious diseases. As he himself said, when once the right method was found, the solutions of the problem came to their hands as easily as ripe apples fell from the trees. It was the method which was essential. It was the method which Koch had looked for. It was the method which he had found.

In 1882 Koch worked out the etiology of tuberculosis by his discovery of the tubercle bacillus. To do this he devised a new method of staining by means of which he could differentiate between the organisms always present in tuberculous lesions, and those accidentially found there, finally succeeding in cultivating the organisms he had stained on solidified blood serum, and proving their relation to the disease by inoculation experiments. The preliminary report of this work appeared in 1882 in the *Berliner klinische Wochenschrift*, the full account of the many experiments being published in 1884 in the second volume of *Mittheilungen aus dem kaiserlichen Gesundheitsamte*. The main points in the life history of the tubercle bacillus, its relation to tuberculosis and the methods which should logically be adopted to prevent the spread of this disease were presented with great clarity and not only are these publications of Koch's models for future generations of scientists, but the practical importance of the knowledge furnished the world by Koch at this time can hardly be overestimated. In reading these papers it is interesting to note that in his early work Koch held certain ideas which could not later be substantiated. Thus he believed that the small highly refractile bodies seen in the tubercle bacillus were spores, a point of view not subsequently confirmed. He also taught that tuberculosis of man and of animals was identical and due to the same bacillus, and that the bovine disease was a source of great danger to the human race, and was to be treated like other diseases of animals transmissible to man. As is well known this opinion was greatly modified by Koch himself in his later work.

In this communication Koch seems for the first time to have clearly formulated in print the laws which go by the name of "Koch's postulates," although he evidently made use of these postulates in verbal communications before this period. In a later address entitled *Ueber bakteriologische Forschung* which Koch delivered before the International Medical Congress in Berlin in 1890, we find the fullest and most satisfactory exposition of these laws. According to these postulates a parasite to be regarded as the cause of a disease must fulfill certain conditions. First, it must be found in every case of the disease, and under conditions which explain the pathological changes and the clinical symptoms. Secondly, it must not be found as an accidental and harmless parasite in other diseases. Thirdly, after isolation from the body and cultivation in pure culture, it must have the ability to produce the disease. When these conditions are fulfilled then no other relation between the parasite and the disease can be imagined than that the parasite is the cause of the disease.

In 1883 Koch was made the head of the German Commission and went first to Egypt and then to Indi a painstaking investigation of Asiatic cholera, both in and in the post mortem room, he not only established new points concerning the pathology of the infection, isolated the cholera vibrio and brought forth convincing of its etiological relationship. Of especial importance the public health standpoint was his cultivation of the from drinking water and from articles of food. The pos of contact infection in this disease was not overlooked by and some of his earliest work demonstrated the presence living vibrios on the clothing of patients. On Koch's from India he was given a donation of 100,000 marks State and Kaiser Wilhelm I bestowed upon him the the Crown, second class.

In 1885 Koch left the *Gesundheitsamt* and became Prof of Hygiene and Bacteriology in the University of chair with this title being made for him. Both *Gesundheitsamt,* and later at the University his labor were crowded with men from all over the world an learn the new methods and technique. England, France and Italy were well represented but German phy flocked to him especially, many of them to take the Cholera Diagnosis which he offered at the *Gesundh* this being required by the Government of the official men who were stationed on the frontier. In the list ents who worked with Koch or took the courses off his laboratory are many of the foremost investigators present day, included among the number being Gaffky, Hueppe, Wolfhügel, Esmarck, Behring, Flügge, Gärtner, Fisher, Wassermann, Froboenius, Kolle, Fraenkel, Hesse, Weiss and Kossel in Germany; Prudden, Abbott, Vaughan, Novy, Biggs, Laplace, Ernst and Shakespeare in this country. But three these last named, however, actually worked under self, Dr. Welch and Dr. Prudden and later Dr. Ernst Hygenic Laboratory of the University.

It is significant that the etiology of many if not jority of the infectious diseases which we now unders solved by Koch or his pupils. Thus to Koch himself credit anthrax, tuberculosis, cholera, infectious conju to Gaffky, typhoid fever; to Loeffler, diphtheria and to Pfeiffer, influenza; to Kitasato, tetanus, symptom thrax, and bubonic plague in part. In many other the methods which Koch devised, when adopted by lowers all over the world, have brought solution to of the greatest importance in medicine and surgery.

It is interesting to us at Johns Hopkins that Dr. came directly from his studies in Berlin, where he was sonal student of Koch at the University and took Ko course in bacteriology, to Baltimore when the pat laboratory of the Johns Hopkins Hospital was open brought with him cultures of a number of micro and at once gave courses in bacteriology similar to in Berlin. Our laboratory is thus one of the first [illegible] adopted, and to Dr. Welch more than ny one else American medicine is indebted for the introduc- of the Koch methods.

'he establishment of the Saranac laboratory for the study uberculosis by Dr. Trudeau may also be regarded as the ct outcome of Koch's first paper on tuberculosis published .882.

ı 1890 Koch described the preparation of tuberculin which immediately heralded about the world as the great specific tuberculosis. Its failure to become this specific is the one on Koch's reputation. As Trudeau so clearly points out, h in his first investigation on this remedy departs for the time in his life from the rigid methods which he pre- ısly and subsequently applied to all his work. Careful nination of Koch's original publication on tuberculin es little doubt that Koch was himself thoroughly convinced it was a great healing remedy for early cases of tuber- sis of the lung. Why it was that he did not demand of self the rigid proof for his statements which he knew others ld at once demand of him will always remain a mystery. what other man of science can it be said, however, that ing a life-activity of forty years but one of the many im- ant conclusions which he drew from his work could not be equently confirmed?

ı 1891 Koch became Director of the *Institut für Infec- skrankheiten* in Berlin which was built under his special ction. Here he remained as Director till 1904 when he relieved at his own request, his place being taken by his ner pupil Gaffky. From 1904 till his death he was *Ehren- ȷlied* or Honorary member of the Institute and continued e his active investigations. The Institute, like the Hy- ic Laboratory of the University and the *Gesundheitsamt,* s turn became the Mecca for native and foreign students. h gathered about himself a number of the foremost inves- ors in Germany who attracted to themselves men from ous parts of the world. Wassermann, one of the ablest of ı's assistants, has been especially friendly to Americans a number of Johns Hopkins graduates have worked with thus coming indirectly under Koch's influence. Among s in this country who worked in the Institute may be ioned: Strong, Ford, Cole, Moss, Jobbling and Mitchel.

ıring the period when Koch served as Director of the In- e he was constantly engaged in the study of the infectious ses and was especially concerned with the problem of de- g the proper measures to limit their spread. The pro- es adopted at the time of the great cholera epidemic in burg in 1892 were largely the result of his discoveries. following year he made further important contributions r knowledge of this disease and pointed out how clearly of the great epidemics could be traced to polluted water, ating water filtration as the best means of preventing its l by this path.*

infectious diseases and in his earliest publication calls attention to the possibility that protozoa as well as bacteria may be the cause of disease in man. In 1896 at the behest of the English Government he went to South Africa and Cape Colony to study rinderpest. He devised a method of preventive inoculation to control this disease and spent some time there in the study of protozoan parasites. Upon his return to Berlin he published the results of his investigations upon Texas fever, tropical malaria, black-water fever, surra, and also upon rinderpest and bubonic plague. He was particularly interested in the study of malaria and spent some time in Italy in 1898 investigating the disease in that country.

In 1900 Koch gave his famous London address on tuberculosis, in which he modified the views orginally expressed as to the identity of bovine and human tuberculosis and maintained that no great danger exists of the transmission of the animal disease to man. In combating the disease, the greatest emphasis, he said, should be laid upon preventing the direct spread of tuberculous infection from people suffering from the disease, particularly in its active form. A storm of criticism arose but rapidly abated when the various investigations which this address stimulated revealed that most cases of human tuberculosis show the human type of the tubercle bacillus and not the bovine type. While the amount of bovine tuberculosis in children is probably greater than was admitted by Koch in 1900 the decade which has passed has served only to demonstrate the correctness of Koch's view that our greatest efforts should be directed towards preventing infection from pre-existing cases of human tuberculosis.

In 1902 Koch made a trip to German East Africa on behalf of the German Government, to engage in the study of the *Küstenfieber der Rinder,* and on his return published important observations upon this disease and upon recurrent fever and trypanosomiasis. About this time also he began his campaign against typhoid fever in southwest Germany, establishing new principles according to which this disease is to be controlled. The ideas which Koch promulgated at this time in regard to this infection have been adopted in nearly all civilized countries where typhoid fever exists.

In 1905 Koch was one of the recipients of the Nobel Prizes and in 1906 he headed the Sleeping Sickness Commission and with the members of this Commission went to German East Africa, to English Central Africa and to the Victoria Nyanza. At this time he introduced the use of atoxyl in sleeping sickness. In the following year Koch came to America and took part in the International Tuberculosis Congress held in Washington in that year. On his return to Berlin he was made a member of the Academy of Sciences and was given the title *Excellenz* by the present German Emperor.

The latter part of Koch's life it seems to me is extremely

---

e method of cultivating cholera vibrios from the dejecta by of the Dunham's solution of peptone and salt was first em- by Professor Dunbar of the Hygienic Institute of Hamburg, who was also the first to cultivate the organism from the dejecta of individuals with no symptoms of the disease. In connection with this the following papers should be consulted: Koch, Ztschr. f. Hyg. u. Infectionskrankh., 1893, xiv, 326; Dunham, *Do.*, 1887, II, 337; Koch, Berl. klin. Wchnschr., 1893, xxx, 1; Gaffky. Arb. a. d. Gsndhtsamte., Berl., 1896, x, 110.

sad. Bitterly disappointed as he must have been in the failure of tuberculin to become the great healing remedy he had clearly expected it would be, adopting in his family life a course of conduct which alienated him from many of his friends and apparently robbed him for some time of some of those official honors which his scientific attainments had merited so long, gradually losing his strength and suffering from infirmities which a life-long devotion to science had brought on, Koch seems a somewhat pitiable figure. He was indeed deprived of that peaceful and honorable old age which the people of his race so dearly love. Throughout this period of Koch's life he carried himself with the greatest dignity of character, indifferent to the criticisms which were heaped upon his private life, just as previously he had been indifferent to the strictures which were passed upon his scientific work. In March, 1910, he began to suffer from cardiac distress, but refused to give up his work at the Institute, where he labored daily from nine in the morning till half-past two in the afternoon. On April 7 he lectured on the Epidemiology of Tuberculosis before the Berlin Academy of Sciences, his address on this occasion being published some months after his death in the *Zeitschrift für Hygiene* which he and Flügge had founded.

On April 9 he had a sudden attack of heart failure in the night and was saved only by the use of the strongest stimulants. Under the untiring care of his former colleague and devoted friend, Dr. Brieger, he gradually improved a little in strength and health, but he knew the end had come and he estimated with scientific accuracy the number of days and hours he was likely to survive. His strength, however, was somewhat greater than either he or his physicians had anticipated and he recovered sufficiently to sit up in a wheeled chair and receive the visits of his devoted friends. In his modest apartments surrounded by his collections of minerals, plants and animals, his chief delight was talk of the science to which his life had been devoted. His failing faculties could always be roused by the slightest reference to new ideas in bacteriology even when his failing will power could hardly concentrate his attention upon the events of this life. His strength revived sufficiently for him to be removed to Baden-Baden, where it was hoped that the clear balmy air might assist his recovery, but his race had been run and he died Friday, May 27, in the 67th year of his age. Like his great master, Goethe, whose precepts he had followed from his youth up, Robert Koch met death face to face.

His body was cremated on the following Monday, and his ashes now rest in the Institute founded for him in Berlin in a special room where also are deposited the various medals and orders bestowed by a devoted people upon one of the greatest, if not the greatest, of her many sons whose lives have been devoted to the study of the medical sciences.

BIBLIOGRAPHY.

In preparing this account of Koch and his work I am particularly indebted to a short life of him which was written by W. her and was published in 1891 in Berlin, entitled *Robert Koch, graphische Studie*. In the historical development of the subject frequent reference was made to Loeffler's Vorles *über die geschichtliche Entwickelung der Lehre von den terien,"* Leipzig, 1887. During the past year a number portant biographical notices of Koch have appeared in the literature and among them are especially to be noted a Ehrlich in the *Zeitschrift für Immunitätsforschung und mentelle Therapie. Originale*, 1910, Bd. VI., Heft 1; an address Gaffky in the *Deutsche medicinische Wochenschrift*, 1910, s. 2321; a paper by C. Fraenkel in the *Münchener medicin. Wochenschrift*, 1910, No. 25, s. 1345, and one by Trudeau in *Journal of the Outdoor Life*, 1910, July, p. 189. The enor activity of Robert Koch is indicated by the many papers he published. The following list includes the most importa his scientific contributions, but is in no sense to be regarded complete record of his writings:

1. Ueber das Vorkommen von Ganglienzellen an den Nerven des Eine von der medizinischen Fakultät zu Göttingen gekrön schrift. Göttingen, W. F. Kaestner, 1865.
2. Die Aetiologie der Milzbrand-Krankheit, begründet auf die lungsgeschichte des Bacillus Anthracis. Beitr. z. Biol. d. (Cohn), 1876, Bd. II, Heft 2, s. 277.
3. Verfahren zur Untersuchung, zum Conserviren und Photog der Bacterien. Beitr. z. Biol. Pflanz. (Cohn), 1877, Bd. II, 399.
4. Untersuchung über die Aetiologie der Wundinfectionskra Leipzig, F. C. Vogel, 1878.
5. (1) Zur Untersuchung von pathogenen Organismen. (2) Die gie des Milzbrandes. (3). Ueber Desinfection. Mitth. Gsndhsamte. 1881, Bd. 1, s. 1, s. 49, s. 234.
6. Koch and Wolfhügel: Untersuchung über die Desinfection mit Luft. Ibid. 301.
7. Koch, Gaffky, and Loeffler: Versuche über die Verwerthbarkeit Wasserdämpfe zu Desinfections-zwecken. Ibid. s. 322.
8. Entgegnung auf den von Dr. Grawitz in der Berliner medic Gesellschaft gehaltenen Vortrag über die Anpassungsthe Schimmelpilze. Berl. klin. Wchnschr., 1881, Bd. 18, s. 76
9. Ueber die Milzbrandimpfung. Eine Entgegnung auf den von in Genf gehaltenen Vortrag. Kassel und Berlin, T. Fisher, 18
10. Die Aetiologie der Tuberculose. Berl. klin. Wchnschr., 188 p. 221.
11. Kritische Besprechungen der gegen die Bedeutung der Tuberk gerichteten Publicationen. Deutsche med. Wchnschr., 188 s. 137.
12. Der Seitens des Geh. Reg. Rath. Dr. R. Koch an den Staats des Innern, Herrn Staatsminister v. Boetticher, Excellenz Bericht. Deutsche med. Wchnschr. 1883. No. 42. s. 615. Der zweite Bericht der deutschen Cholera Commission. 50, s. 743.
    Der vierter Bericht. Ibid. 1884, No. 4, s. 63.
    Der fünfter Bericht. Ibid. 1884, No. 7, s. 111.
    Der sechster Bericht. Ibid. 1884, No. 12, s. 191.
    Der siebenter Bericht. Ibid. 1884, No. 14, s. 221.
13. Ueber die Cholerabakterien. Deutsche med. Wchnschr. 1884, s. 725.
    Translation of this paper appeared in the British Med. 1884. Vol. II, pp. 403, 453.
14. Die Aetiologie der Tuberculose. Mitth. a. d. k. Gsndhtsamte. 18 II, s. 1.
15. Koch, Gaffky, und Loeffler: Experimentelle Studien über die Abschwächung der Milzbrandbacillen und Milzbrandinfectio Fütterung. Mitth. a. d. k. Gsndhtsamte. 1884, Bd. II, s. 1
16. Koch und Gaffky: Versuche über die Desinfection des Kiel geraums von Schiffens. Arb. a. d. k. Gsndhtsamte. 188 s. 199.
17. Was Wissen und Können unsere Aerzte? Ueber Naturheilung und izinische Kunst. Leipzig, H. Huche. 1885.
18. Bericht über die Thätigkeit der zur Erforschung der Cholera 1883 nach Egypten und Indien entsandten Kommission. Arb. Gsndhtsamte. Bd. III, 1887. (On page 19 of the Anlage volume is found Koch's first reference to the bacillus observed in cases of Egyptian conjunctivitis. This was cultivated by Weeks and goes by the name of the Koch bacillus.)
19. Bericht über die Unterschungen des Berliner Leitungswassers Zeit vom 1. Juni. 1885, bis 1. April. 1886, ausgeführt in hyg Institut der Universität Berlin. Berlin, J. Springer. 188
20. Die Bekämpfung der Infektions-krankheiten, insbesondere der seuchen, Rede gehalten zur Feier des Stiftungstages der ärztlichen Bildungs-Anstalten am 2 August. 1888. Hirschwald.
21. Ueber Bakteriologische Forschung. Verhandl. d. X Internat. Berl., 1890. Bd. I, Algemeiner Theil, s. 35, Berlin. 1891.
22. Weitere Mittheilungen über ein Heilmittel gegen Tuberculose med. Wchnschr. 1890. No. 46 a. s. 1029.
23. Fortsetzung der Mittheilungen über ein Heilmittel gegen Tu Deutsche med. Wchnschr. 1891. No. 3, s. 101.
24. Weitere Mittheilungen über das Tuberculin. Deutsche med. W 1891, No. 43, s. 1189.
25. Die Cholera in Deutschland während des Winters 1892 Ztschr. f. Hyg., 1893, Bd. 15, s. 89.
26. Ueber den angeblichen Stand der bakteriologischen Cholerad Ztschr. f. Hyg. 1893, Bd. 14, s. 319.
27. Wasserfiltration und Cholera. Ztschr. f. Hyg. 1893, Bd. 14, s
28. Entgegnung auf den Vortrag des Herrn Professor Dr. M. Sch Zum mikroscopischen Nachweis von Cholerabacillen in De Deutsche med. Wchnschr. 1893, Bd. 19, s. 793.
29. Water Filtration and Cholera. Report Local Gov. Board 189 don, 1894, Vol XXII, p. 439.
30. Koch und Petruschky: Beobactungen über Erysipel-Impfung Menchen. Ztschr. f. Hyg. 1896, Bd. 23, s. 477.

in India und Africa.
e- oder Surra-Krankheit, Texasfieber, tropische Malaria, arzwasserfieber. Berlin, J. Springer, 1898.
e Malaria in Deutsch-Ostafrica. Arb. a. d. k. Gsndhtsamte. 1898, Bd. 14, s. 292.
Ueber Schwarzwasserfieber. Ibid. s. 304.
ber die Verbreitung der Bubonenpest. Deutsche med. Wchnschr. 1898, Bd. 24, s. 437.
rztliche Beobachtungen in den Tropen. Allg. Wien. med. Ztg., 1898, Bd. 43, s. 381.
gebnisse der wissenschaftlichen Expedition des Geheimen Medizinalraths Professor Dr. Koch nach Italien zur Erforschung der Malaria. Deutsche med. Wchnschr., 1899, No. 5. s. 69.
ber Schwarzwasserfieber (Haemoglobinurea). Ztschr. f. Hyg. 1899, Bd. 30, s. 295.
ster Bericht über die Thätigkeit der Malaria-Expedition. Deutsche med. Wchnschr. 1899. No. 37, s. 601.
Zweiter Bericht. Ibid. 1900, No. 5, s. 88.
Dritter Bericht. Ibid. 1900, No. 17, s. 281.
Vierter Bericht. Ibid. 1900, No. 25, s. 397.
Fünfter Bericht. Ibid. 1900, No. 34, s. 541.
Schlussbericht. Ibid. 1900, No. 46, s. 733.
Zusammenfassende Darstellung der Ergebnisse der Malaria-Expedition. Ibid. 1900. No. 49, s. 781.
e Bekämpfung der Tuberculose unter Berüchtigung der Erfahrungen welche bei der erfolgreichen Bekämpfung anderer Infektionskrankheiten gemacht sind. Vortrag gehalten auf dem Britischen Tuberculose-Congress. Deutsche med. Wchnschr. 1901, No. 33, s. 549.
ber die Agglutination der Tuberkelbacillen und über die Verwerthung dieser Agglutination. Deutsche med. Wchnschr., 1901, No. 48. s. 829.
the Transference of Bovine Tuberculosis to Man. Brit. M. J. 1902, Vol. VII, p. 1885.
e Bekämpfung der Malaria. Ztschr. f. Hyg. 1903, Bd. 43, s. 1.
e Bekämpfung des Typhus. Berlin. A. Hirschwald, 1903.
odesian redwater or African Coast fever. Vet. Rec. London. 1903-1904, Vol. XVI, p. 507.
46. Ueber die Trypanosomenkrankheiten. München. med. Wchnschr. 1904. Bd. 51, s. 1987.
47. Vorlaüfige Bericht über das rhodesische Rotwasser oder afrikanische Kustenfieber. Arch. f. wissensch. u. prakt. Tierh. Berlin, 1904. Bd. 30, s. 281.
48. Koch, Schütz, Neufield, und Miessner: Ueber die Immunisierung von Rindern gegen Tuberculose. Ztschr. f. Hyg. 1905, Bd. 51, s. 300.
49. Vorlaüfige Mittheilungen über die Ergebnisse einer Forschungsreise nach Ostafrica. Deutsche med. Wchnschr. 1905. No. 47, s. 1865.
50. Preliminary statement on the results of a voyage of investigation to East Africa. J. Trop. med. 1906, Vol. IX, pp. 43, 75, 104, 137.
51. Ueber Afrikanischen Recurrens. Berl. klin. Wchnschr. 1906, Bd. 43, s. 185.
52. Ueber die Rolle der Milch bei der Uebertragung der Tuberculose auf Menschen. Molkerei-Ztg. 1906, Bd. 16, s. 37.
53. Ueber den derzeitigen Stand der Tuberculosebekämpfung. Deutsche med. Wchnschr., 1906, No. 3. s. 89.
54. The Nobel Lecture on how the fight against Tuberculosis now stands. Lancet, London. 1906, Vol. I. p. 1449.
55. Beiträge zur Entwicklungsgeschichte der Piroplasmen. Ztschr. f. Hyg., 1906, Bd. 54, s. 1.
56. Bericht über die Thätigkeit der deutschen Expedition zur Erforschung der Schlafkrankheit bis zum 25. November, 1906. Deutsche med. Wchnschr., 1907, No. 2, s. 49.
57. Schlussbericht über die Thätigkeit der deutschen Expedition zur Erforschung der Schlafkrankheit. Deutsche med. Wchnschr., 1907, No. 46, s. 1889.
58. Im Dienst des Roten Kreuzes: Errinerungen. Deutsche Rev. 1909, I, 338-348.
59. Antrittsrede in der Akademie der Wissenschaften am 1. Juli, 1909. Deutsche med. Wchnschr., 1909, No. 29, s. 1278.
60. Koch, Beck, und Kleine: Bericht über die Thätigkeit der zur Erforschung der Schlafkrankheit im Jahre 1906-7 nach Ostafrica entsandten Kommission. Arb. a. d. k. Gsndhtsamte. 1909, Bd. 31, s. 1.
61. Epidemiologie der Tuberculose. Vortrag gehalten in der Sitzung der Akademie der Wissenschaften zu Berlin am 7 April, 1910. Ztschr. f. Hyg. 1910, Bd. 76. s. 1.

ROBERT KOCH,*

(December 11, 1843 - May 27, 1910.)

THE FATHER OF THE MODERN SCIENCE OF TUBERCULOSIS.

By S. Adolphus Knopf, M. D.,

Professor of Phthisiotherapy at the New York Post-Graduate Medical School and Hospital.

· the privilege of being with you here to-night and of g in the tribute which this Society, founded for the of tuberculosis, is to pay to the lately departed master modern science of tuberculosis, I feel profoundly grate- We who are outside of the justly celebrated Johns ns Medical School look upon it as a Mecca to which a nage means hearing and seeing the best that exists in n medical science, and for this reason I feel all the glad to be with you and much honored by the invita- xtended to me by the officers and members of this y.

ı all your eagerness for the study of the latest things may help to throw light on unsolved medical problems eve human sufferings, you remain true to the tradition shed by the two most distinguished founders of the l department of this great university, Professors Osler elch, in that you do not neglect the historical study of ne and, whenever occasion presents itself, you pay to the pathfinders or heroes in our beloved profession. ning this society the "Lænnec" you honored one who haps the greatest savant in the science of tuberculosis lay, the immortal René Théophile Hyacinthe Lænnec ary 17, 1781–August 13, 1826). It was he who taught us so much about the tubercle as the characteristic macroscopic evidence of tuberculosis and who invented for us the stethoscope, that valuable instrument almost indispensable in the diagnosis of pulmonary and cardiac diseases.

To-night you are here under the auspices of this society to honor the memory of one whom I believe we can justly call the father of the modern science of tuberculosis. The officers of this society have graciously assigned to me the task of speaking on Robert Koch's achievements regarding tuberculosis.

Koch's brilliant career as father of the modern science of tuberculosis began, of course, on that memorable evening of the 24th of March, 1882, when he gave to the world the result of his painstaking work. It was the usual monthly meeting of the Physiological Society of Berlin, but it was perhaps the largest gathering which that body ever had. Koch's paper was announced under the title, "The Etiology of Tuberculosis." Taking into consideration what Koch had given to science before along the same lines (I refer to the discovery of the spores of the anthrax bacillus and his concomitant bacteriological studies), the hearers were, of course, expectant and looked for great things in store for them. It was characteristic of Koch's modesty and true scientific spirit that he had preferred to refrain from talking about his researches in tuberculosis until he could conclusively prove his thesis to the satisfaction of everyone and show absolutely accurate results.

---

ess delivered before the Lænnec Society for the Study of losis, The Johns Hopkins Hospital, Baltimore, March

To students of bacteriology it must be recalled that Koch was the first to seek the production of a solid medium for the purpose of getting pure cultures, and it was only after he was in possession of such a medium that he attempted to isolate the germ found in tuberculous tissue.

It is of historical interest that on the evening of March 24, 1882, after Koch had finished reading his paper, there was no applause or any enthusiastic manifestation of approval, and for the first time in the history of that society the paper, though listened to with the most profound and respectful silence, was not discussed. The facts presented by that master of bacteriological science were too convincing for discussion. The audience looked expectantly to that most honored member and veteran debater, father of cellular pathology, the immortal Rudolph Virchow, but he too remained silent. He felt that another great master in medicine had arisen, and that the evidence of Koch's conclusions did not permit any doubt or dispute. The original communication announcing the discovery of the tubercle bacillus as the prime and only cause of tuberculosis appeared in the *Berliner klinische Wochenschrift* of 1882 (No. 15, p. 221). It is a masterpiece of scientific demonstration.

It might be interesting to my young hearers to know that they can get access to an exact reproduction of this paper in the *Zeitschrift für Tuberkulose* of July, 1910 (Band 16, Heft 2). The editors of this periodical very justly stated that a more fitting memorial could not be printed at the time of Koch's death than that important paper which gave rise to all our modern tuberculosis research work and at the same time gave to its author a well-deserved recognition and world-wide reputation.

In his paper Koch did not fail to pay tribute to the works of Villemin, Cohnheim, Salomonsen, Baumgarten and Tappeiner, who had given us conclusive proof that tuberculosis was a transmissible disease, but through Koch—and Koch alone—we have come to know the actual factor of infection and direct cause of all tuberculous diseases. It is he who showed us the presence of the germ in the pulmonary secretions and involved tissues, and also, to a minor degree, in other secretions of man and beast afflicted with tuberculosis. It is because of this knowledge that the new science which we might call the modern prophylaxis of tuberculosis was created.

And now, after a lapse of nearly thirty years since the memorable discovery, we can statistically prove, beyond the shadow of a doubt, that, thanks to the rational, practical yet simple methods of prophylaxis which soon followed the discovery of the bacillus of tuberculosis by Robert Koch, the mortality from tuberculosis has been on a steady decrease in nearly all civilized countries.

When we consider that the present morbidity and mortality from tuberculosis in the countries which have adopted rigorous anti-tuberculosis measures is in some instances two- [illegible] in some even one-half what it formerly was, we [illegible] admit that the material wealth which is the gain of thousands of communities, because Koch lived and is beyond human calculation. Our sociologists and mists have estimated the value of a single human life economic asset of $5000 to a community. Thus the in material gain to the world at large for which this is responsible must stagger our imagination. But physicians do not look upon life only as represen financial asset to the community. We come into contact with human suffering and sorrow for that. We emphasize the value of the discovery of our great the number of fathers, mothers, wives, husbands and who were saved from an untimely death. We think tears and sorrow, of the anxiety and worry spared to numbers; we appreciate the joys and happiness preserved to thousands because the great white plague enter their homes. And all this preservation of and happiness has been brought about because of discovery of Koch and the resulting indication of prevent disease.

But this phase of our medical science, which is ventive medicine, is not the only one whereby we as and the world at large have been benefited by covery. The presence of the bacillus in the sputum doubtful cases a well-nigh irrefutable evidence of infection of the respiratory tract.

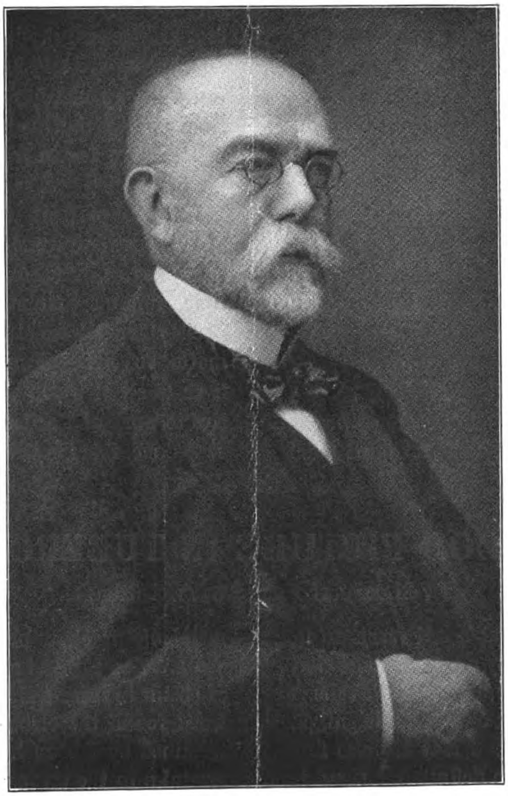
In the discovery of tuberculin Koch has given us adjuvant of great value in the diagnosis of tubercu eases in man and animal.

A word regarding tuberculin as a therapeutic is now generally conceded that when in 1890 Koch an to the world the discovery of tuberculin as a means of tuberculosis, he did it against his better judgment, that he had not experimented with it long enough. 1890 was indeed an unhappy one in Koch's brilliant The powerful product used in far too large doses perienced men indiscriminately in early and late followed by disastrous results. But time has Koch's original claim, and to-day his tuberculin in the of careful clinicians has certainly proven to be, in cases of tuberculosis, a valuable therapeutic adjuvant

Koch did not limit his researches to the bacteri causes of tuberculosis or to the discovery of tubercul may be a surprise to many to learn what a deep took in the sociological aspect of tuberculosis. He all sides of the question—municipal control, popu cation, the housing problem, etc. More than once express to me personally his approval of Professor work in New York relating to the municipal control culosis, and he also referred to it in his celebrated address in 1901.

In regard to this communication made before the Congress, justice requires us to say that Koch's as to the rarity of the transmission of bovine tuber human beings were too sweeping, this having been by subsequent investigations. But had it not been

Koch's last paper, read before the Academy of Sciences of Berlin on April 7, 1910, only about six weeks before his death, nd published in the *Zeitschrift für Hygiene und Infektions-rankheiten* October 28, 1910 (Vol. LXVII, No. 1), showed is deep interest in the sociological aspect of tuberculosis. The article was entitled "The Epidemiology of Tuberculosis." n it he very justly ascribes the still very great prevalence of uberculosis in certain sections of Europe to the unfortunate ousing conditions and particularly to he overcrowded sleeping quarters of he masses. He also came to the conlusion that where institutional care ad been most readily available, the orbidity and mortality from tuberculosis have been reduced to the greatst extent, and vice-versa.



Koch believed in popular education, nd I have received many a kindly ord from him to encourage me in my umble labors in that direction. In is last letter to me, a few months efore his death, he wrote:

> **Popular works on tuberculosis are desined to play an important part in the nlightenment of the people, and the merican people seem to be particularly usceptible to such education.**

hope we may deserve this gracious ompliment paid to the American eople by the great Koch.

And now, in conclusion, a few words n the personal side of this great man. On the evening of the 11th of April, 908, Koch was the guest of the German Medical Society of New York. It vas indeed a distinguished gathering. Professor Karl Beck, as the president f the Society, was the oastmaster of the evening. our own distinguished eacher, Professor Welch, eing one of Koch's first upils, welcomed the great cientist to our shores, and spoke in eloquent words of the chievements of his master. Equal praises were bestowed upon Koch by the Nestor of the New York and the entire American edical profession, Professor Abraham Jacobi. Andrew Caregie, the philanthropist, who had given 500,000 marks for the Koch Institute in Berlin, praised Koch as a hero of civiliation and peace, far greater than a hero in war, and concluded y saying:

> **Every age has its ideals, and the servants and saviors of mankind are our present-day ideals, for I firmly believe that service mankind is the highest service to God.**

acter that I believe it to be worth while to reproduce it in the original words. I will repeat it here in German as it was delivered, and translate it into English as exactly as possible:

> *Wenn ich alles zusammenfasse, was hier zu meinem Lobe gethan und gesagt worden ist, und die grosse Auszeichnung, die Sie mir zu Theil werden liessen, in Betracht ziehe, dann entsteht in mir ein Bedenken, ob ich auch wirklich berechtigt bin, mich so feiern zu lassen. Manches von dem, was mir Rühmliches nachgesagt wird, kann ich, wie ich glaube, mit gutem Gewissen akzeptieren. Aber ich habe nichts anders gethan, als was Sie jeden Tag thun, nämlich ich habe gearbeitet was ich konnte und meine Pflicht und Schuldigkeit gethan. Wenn etwas mehr dabei herausgekommen ist, so liegt das daran, dass ich auf meinen Wanderungen durch das medizinische Gebiet auf Strecken stiess, wo das Gold noch auf dem Wege lag. Es gehört allerdings Glück dazu, das Gold von dem Unedlen scheiden zu können; das ist aber kein besonderes Verdienst. Es freut mich besonders, Herrn Carnegie hier zu sehen, dessen hochherzige Spende zur Koch-Stiftung allenthalben einen tiefen Eindruck gemacht hat. Ich möchte Herrn Carnegie meinen bescheidenen aber herzlichen und warmen Dank aussprechen. Die meinen Namen tragende Stiftung ist berufen, grosse Resultate auf dem Gebiete der Erforschung der Tuberkulose zu zeitigen. Während die Gründung von Krankenhäusern und Sanatorien in der Bekämpfung der Tuberkulose von lokaler Bedeutung sind, soll die Koch-Stiftung uns ermöglichen, in das Wesen der Krankheit tief einzudringen, um so Vorteile zu schaffen, die der ganzen Menschheit zu Gute kommen. Herr Carnegie ist für mich die Verkörperung der besten Eigenschaften des Amerikaners. Er hat seinen Blick gerichtet auf die höchsten und edelsten Ziele.*

R. Koch. 9/IV 1910

TRANSLATION.

When I now consider the honor you have conferred upon me here this evening, when I consider all that has been said and done in my praise, there arises in my mind a doubt as to whether I am really entitled to such distinction. Some of the kind things which have been said of me I believe I may accept with a clear conscience, but I have done nothing else than what you are doing every day. I have worked as hard as I could and have fulfilled my duty and obligations. If the success really was greater than is usually the case, the reason for it is to be found in the fact that in my wanderings through the medical field I came upon regions where gold was still lying by the wayside. Fortune is necessary to be able to distinguish gold from the base metals, but that is no great merit. I am glad to see Mr. Carnegie here, whose generous gift to the Koch Foundation in Berlin made everywhere such a deep impression. I would wish to thank Mr. Carnegie with all my heart. The foundation which is to bear my name is, I hope, destined to show great results in the field of tuberculosis research. While special hospitals and sanatoria for the treatment of tuberculosis are of local importance in the combat against tuberculosis, the Koch Institute or Foundation is destined to study the underlying causes and as yet unsolved problems of the disease and thus will benefit mankind at large. Mr. Carnegie is to me the embodiment of all the best qualities of an American. His ideals are the highest and noblest.

Koch had a remarkable genius for research work, yet his aim was always eminently practical and his sympathies genuine and real. By hard work and diligent application he revealed to us the hidden mysteries of disease.

Koch was not privileged to see the foundation for further tuberculosis research work, bearing his name, completed. He died on May 27, 1910, surrounded by devoted pupils and friends. By indubitable right he now takes his place with the Immortals and his name will be handed down through generations to come as one who lived and labored for the good of mankind.

In accordance with Koch's last request, his funeral was of the simplest kind, and as an enthusiastic sanitarian he had directed his body to be cremated. His admirers and pupils gathered the ashes of the beloved master and enshrined them in a mausoleum located in the *Institut für Infektionskr heiten* in Berlin, of which Koch had been a director for years.

I venture to say that for generations to come, all physic and likewise the many men and women outside of the p fession who are interested in scientific or preventive med will, on visiting Berlin, deem it a pious duty to make a grimage to this last resting-place of the ashes of Robert K

When Professor Koch wrote me the last time he hon me by sending his photograph taken a short time before he ill. This picture is considered by all who knew Koch one of best. He graced it with his signature dated February 9, 19 In availing myself of the permission granted to me to pre you with an enlarged reproduction, I beg you to acce from one of the thousands of humble disciples of the gr master as a feeble tribute to him and as a token of es for the officers and members of your society.

Let this portrait, which shall henceforth grace the wa of this great university, this likeness of a prince of sci a teacher of teachers, one of the greatest physicians of time, remind present and future members of the Lan Society and all the students of this great university of K motto in life: *Nunquam otiosus* (Never be idle). L it be to all of us, to you and to me, an inspiration, an in tive to work and a reminder of the fact that though much been done, there is still more to do.

THE BLOOD PICTURE IN TUBERCULOSIS.

By Margaret Reed Lewis, Baltimore.

The fact has long been established that a cell reacts to its environment and that the condition of any cell at any one time depends upon its environment. The assumption that the cells of the blood would react to the condition of the plasma, might have been made, but it was not until 1896 that Holmes first called attention to the fact that there is a definite relationship between the state of the leucocyte of the blood and the progress of the disease in tuberculosis. Holmes studied the entire cell and while he perceived the metabolic changes of the leucocytes as shown by their granules and even in some cases mentions the condition of the nucleus, he did not observe that there is a definite relationship between the state of the nucleus and the condition of the cell.

To quote Holmes, "A careful study of 100 cases of tuberculosis has shown conclusively that the laws, which bring about disintegration in a tuberculosis patient, bring about the same process at an earlier date in tubercular leucocytes. In these cases, I have found a marked disintegration going on in all varieties of leucocytes and a great decrease in the number of young cells. The tissue forming power of these cells is imperfect. Many of the young cells present is a good sign of recuperative power on the part of the patient."

[illegible] relationship between the state of the nucleus and the metabolic processes of the cell has been investigated by ma observers as for instance, Korschelt found that the forma of chitin in insects is associated with nuclear changes. Gr wood found the elaboration of digestive fluids in cells is termined by the nucleus. Maximow found that the secre granules in the serous cells of the salivary gland originate the inner surface of the nuclear membrane. Mathews sho that the zymogen granules of the pancreas cells are formed the expense of nuclear fibrillae. The relationship between metabolic processes of the cell and the nucleus has not definitely worked out but the observations of Jacquet, Spi Loeb and R. Lillie seem to demonstrate that the nucle especially concerned in the oxydative processes of the cell.

Soon after Holmes' work appeared, Arneth observed there is a relationship between the state of the nucleus of neutrophile of the blood and the condition of the patien tuberculosis. In 1905, Arneth published all his observat upon tuberculosis patients as a monograph, "Die Lun schwindsucht," in which he states clearly his conclusion form of a neutrophilic blood picture, which is adapted clinical use.

According to Arneth the neutrophile enters the blood myelocyte or at least as a neutrophile having but a single lobes, Arneth calls the lobes "pieces" the older have four or five pieces. The mature neutro- are constantly used up and the younger forms constantly the blood, so that if at any time more of the mature forms ed up, it is shown by a larger proportion of the neutro- with one or two lobed nuclei than is usually present.

pieces of the nucleus are of two types, the round piece Kernteile," which does not divide again and the bent or "Schlingen," which may divide again. Arneth's ations upon human blood show that the neutrophiles can ided into five classes according to the number of pieces nucleus and those classes subdivided according to the of pieces in each class, as is seen in the following table.

ARNETH'S BLOOD PICTURE.

NEUTROPHILES.

CLASS I.

with 1 round piece (1 Kernteile). Fig. 1.
with 1 bent piece (1 Schlingen). Fig. 2.

CLASS II.

with 2 round pieces (2 Kernteile). Fig. 3.
with 2 bent pieces (2 Schlingen). Fig. 4.
with 1 round piece and 1 bent piece (1 Kernteile und 1 Schlingen). g. 5.

CLASS III.

with 3 round pieces (3 Kernteile). Fig. 6.
with 3 bent pieces (3 Schlingen). Fig. 7.
with 2 round pieces and 1 bent piece (2 Kernteile und 1 Schlingen). g. 8.
with 1 round piece and 2 bent pieces (1 Kernteile und 2 Schlingen). g. 9.

CLASS IV.

with 4 round pieces (4 Kernteile). Fig. 10.
with 4 bent pieces (4 Schlingen). Fig. 11.
with 3 round pieces and 1 bent piece (3 Kernteile und 1 Schlingen). g. 12.
with 2 round pieces and 2 bent pieces (2 Kernteile und 2 Schlingen). g. 13.
with 1 round piece and 3 bent pieces (1 Kernteile und 3 Schlingen). g. 14.

CLASS V.

with 5 round pieces (5 Kernteile). Fig. 15.
with 5 bent pieces (5 Schlingen). Fig. 16.
with 4 round pieces and 1 bent piece (4 Kernteile und 1 Schlingen). g. 17.
with 3 round pieces and 2 bent pieces (3 Kernteile und 2 Schlingen). g. 18.
with 2 round pieces and 3 bent pieces (2 Kernteile und 3 Schlingen). g. 19.
with 1 round piece and 4 bent pieces (1 Kernteile und 4 Schlingen). g. 20.

clinical purposes Arneth arranged the various forms in 100 neutrophiles as a neutrophilic blood picture as s:

M.	Class I		Class II			Class III				Class IV					Class V					
	1K	1S	2K	2S	1K-1S	3K	3S	2K-1S	1K-2S	4K	4S	3K-1S	2K-2S	1K-3S	5K	5S	4K-1S	3K-2S	2K-3S	1K-4S

h neutrophile as he observed it was counted under the ision of the class in which it belonged; as for instance, rophile with a nucleus as in Fig. 8 would be placed under ision 2K1S of Class III. If any myelocytes were ob- they would be placed under M as myelocytes or embry- eutrophiles.

th finds the neutrophilic blood picture of normal per- be—(the numerous sub-divisions are not quoted in this —:

B.C.	M.	Class I	Class II	Class III	Class IV	Class V
00	0	5	26	36	28	5

berculosis the older neutrophiles are continually used so the large proportion of neutrophiles shifts to the left this picture as

Then if the patient recovers and so uses up fewer of the older forms, the proportion of neutrophiles again shifts to the right side of the picture. According to Arneth, every case where there is even a slight shifting to the left of the neutrophiles can be diagnosed as tuberculosis, but our observations show that this is probably not so and that other conditions than tuberculosis may give the neutrophilic blood picture with only a slight shifting to the left, so that for diagnosis or prognosis the other blood cells as well as the neutrophiles must be considered.

Investigation was undertaken at the Bellevue Hospital, New York City, under the charge of Dr. J. Alexander Miller, head of the Tuberculosis Out-Patient Department, to determine whether this work of Arneth's was of practical value clinically, especially whether it had any value in regulating the use of tuberculin. In this work over 200 cases were observed with an average of 30 counts on each case. Some of these cases were observed for a period of three years, and on each of these about 100 counts were made.

The division of the neutrophiles into classes according to the lobes of the nucleus sounds simple, but when a number of counts had been made, it was found almost impossible as well as of no especial value to keep to Arneth's sub-divisions, so it was decided to note only the class in which the neutrophile belonged and not the kind of lobes. The threads connecting the lobes of the nucleus are of varying length and thickness and the bending of the lobe to form "Schlingen" is also of varying degrees, so that the decision as to whether a bent lobe shall constitute one lobe or two lobes of the nucleus, will always vary according to the personal equation of each individual investigator. In these observations all bent lobes of the nucleus, where the nuclear bridge was large enough to admit of good nuclear network, Fig. 21, were classed as one lobe, but where the nuclear network is condensed into a coarse thread, Fig. 22, or a fine thread, Fig. 23, they were classed as two lobes. The question as to whether one lobe of the nucleus is on top of another was always decided by careful focussing with a high power. Any very questionable case was not counted. The study of the blood smears, to obtain the neutrophilic blood picture soon showed that changes were to be noted among the other cells of the blood, so a blood picture was made, which would include all the white blood cells, but as no definite change was found in the other cells only the number of each present was noted.

Two hundred neutrophiles were usually counted, never fewer than 100 and the number of the other kind of white blood cells observed while counting these were noted, making a blood picture as follows:

Neutrophiles of Class I, Class II, Class III, Class IV, Class V. Large Lymphocytes. Small Lymphocytes. Eosinophiles, Basophiles and the number of white blood cells. Smears from the blood of a normal person give a blood picture as follows:

Class I	II	III	IV	V	L.L.	S.L.	E.	B.	W.B.C.
5	22	48	26	5	22	18	1	0	8,000

In case a differential blood count is desired it can easily be computed from the complete blood picture.

Many schemes for an index were devised for tabulation purposes and it was finally decided that the changes in the blood picture would be more clearly shown if the number of neutrophiles in Class I + Class II and one-half of Class III, as compared with the number in one-half of Class III + Class IV + Class V was used as an index. This same index was used in some observations by Bushnell and Treuholtz, which appeared later. In the normal blood picture there is about the same number of neutrophiles on each side, *i. e.*

$$\begin{array}{l} 5+22+\tfrac{1}{2}\,42=48 \\ \tfrac{1}{2}\,42+26+5=52 \end{array} \quad \text{Index}=48:52$$

From a study of the neutrophilic blood pictures from over 30 supposedly normal persons, the normal blood picture was found to be

I	II	III	IV	V	L.L.	S.L.	E.	B.	W.B.C.	Index
5	22	42	26	5	22	18	2	1	8,000	48 : 52

But the study of these blood pictures showed that a blood picture with an index anywhere between 45 : 55 and 55 : 45 may be considered normal.

The index is usually written as the number on the left side in tabulations.

The blood pictures from a few of the tuberculosis patients are given below.

Patient A.—A young woman who was clinically considered a favorable case. She has neither gained nor lost, but has seemed to improve slightly under the tuberculin treatment. The blood picture shows an improvement after her return from the country, but she returned to work against advice and soon returned to her earlier condition. This patient died during the late summer of 1909.

Date	1	2	3	4	5	6	L.L.	S.L.	E.	M.	Leuc.	Index	Remarks
1907													
May 6	21	41	27	8	2	0	0	0	0	0	......	75.5	Tuberculin.
May 17	22	34	30	12	2	0	0	0	0	0	......	71	
May 20	28	43	20	9	0	0	0	0	0	..	......	81	
May 24	26	41	24	12	2	0	0	0	0	0	......	79	
May 31	24	40	27	10	2	0	0	0	0	0	11,000	77.5	
June 7	25	37	20	14	2	0	0	0	0	0	12,000	72	
June 10	20	31	31	17	1	0	13	18	2	1	11,000	66.5	
June 24	20	41	28	11	0	0	11	23	8	1	10,000	75	
	Away to country.												
Sept. 31	8	38	26	22	6	0	17	20	3	2	8,000	59	
Oct. 14	10	36	39	12	3	0	28	6	2	4	11,200	66.5	
Oct. 18	16	37	31	12	4	0	12	11	2	3	13.600	68.5	
Oct. 21	10	37	33	15	5	0	25	16	7	1	10.000	63.5	
Oct. 28	10	48	31	10	1	0	16	5	4	2	12,600	73.5	
Nov. 1	9	47	38	6	4	0	18	12	4	1	12,800	72.5	
Nov. 8	16	33	33	17	1	0	24	4	6	2	10.000	65.5	
Nov. 11	12	46	32	10	0	0	26	15	6	1	11,000	74	
Nov. 18	..	..	..	..	..	..	..	..	..	..	10,800	....	
Nov. 22	..	..	..	..	..	..	..	..	..	..	12,000	....	
Nov. 29	10	40	31	17	2	0	17	6	5	0	13.200	65.5	
Dec. 2	16	41	27	14	2	0	28	2	2	0	12,000	70.5	
Dec. 16	..	..	..	..	..	..	..	..	..	..	10,600	....	
1908													
Apr. 3	14	43	34	9	0	0	18	9	3	1	12,000	74	
Apr. 22													
May 4	23	44	28	4	0	1	21	2	3	0	12.000	81	
May 25	16	51	25	6	0	0	19	8	0	0	12,200	79.5	
Nov. 15	18	49	25	7	1	0	20	7	3	2	10,200	79.5	
Nov. 22	..	..	..	..	..	..	..	..	..	..	12,000	....	
Nov. 25	9	38	38	13	2	0	12	4	2	0	14,600	66	
Nov. 29	..	..	..	..	..	..	..	..	..	..	14,200	....	
1909													
Feb. 28	17	43	30	8	2	0	17	7	4	0	13.000	75	
Mar. 9	8	43	34	14	4	0	21	14	1	0	13,200	66	
Mar. 21	Reacted to tuberculin.												
Mar. 23	11	37	42	8	2	0	9	8	3	0	14,000	69	
Mar. 27	12	37	30	18	3	0	15	9	4	0	12,000	64.5	
Apr. 3	10	38	33	18	1	0	12	5	3	1	13,400	69.5	
Apr. 27	11	37	32	16	3	0	17	9	4	1	12,800	64	
May 4	13	40	35	9	3	0	10	5	1	1	13,000	70.5	
May 18	9	44	33	18	1	0	15	8	1	1	14,000	69	

ring the summer.

Patient B.—A young woman who has shown decided under the tuberculin treatment. She has returned to except for a bad cold has been well all winter.

Date	1	2	3	4	5	6	L.L.	S.L.	E.	M.	Leuc.
1907											
May 3	9	38	36	16	1	0	0	0	0	0	......
May 6	8	39	35	17	1	0	0	0	0	0	......
May 17	9	36	42	10	3	0	0	0	0	0	......
May 29	6	20	37	29	8	0	0	0	0	0	9,000
May 31	5	27	37	28	3	0	31	23	4	0	7,800
June 7	8	36	35	19	2	0	0	0	0	0	8,000
June 10	8	18	32	31	11	0	25	23	1	0	9,000
June 24	10	27	29	25	9	0	36	8	2	0	10,000
	Away for summer.										
Sept. 31	2	13	31	41	13	0	31	24	1	..	9,000
Oct. 4	4	22	42	27	5	0	30	28	2	0	8,800
	Gone back to work.										
Dec. 13	Has bad cold.										
	8	34	33	18	2	..	20	18	3	0	10,000
	Away at work.										
1908											
March 16	5	21	43	26	5	0	36	39	8	0	10,000

Patient E.—A married woman with two children whose died with tuberculosis some years before. This patient tuberculin treatment, but never improved noticeably, and died in February, 1908.

Date	1	2	3	4	5	6	L.L.	S.L.	E.	M.	Leuc.	Index
1907												
June 14	16	40	24	16	4	0	18	12	3	2	12,000	68
June 21	17	49	23	11	0	0	10	12	4	0	11,600	73.5
June 24	23	41	26	8	2	0	9	10	4	1	12,200	77
Sept. 31	22	37	29	12	0	0	25	7	2	0	12,000	73.5
Oct. 4	23	42	23	8	4	0	9	7	2	1	9.000	77.5
Oct. 11	26	45	17	11	1	0	14	1	0	2	10,600	79.5
Oct. 14	21	51	20	7	1	0	18	2	1	1	13,200	83
Oct. 25	24	41	24	9	2	0	27	8	4	0	10,000	77
Nov. 1	26	48	16	10	0	0	34	18	4	0	12,000	82
Nov. 8	26	39	22	12	1	0	12	8	5	0	12,600	76
Nov. 11												
Nov. 15	17	38	28	15	2	0	16	5	5	1	13,000	69
Nov. 18	10	49	26	15	0	0	22	6	8	1	12,000	72
Nov. 22	20	50	20	10	0	0	12	4	5	0	15,000	80
	Ill.											
Dec. 16	24	49	20	7	0	0	16	5	4	1	18,000	83
Dec. 20	25	48	19	8	0	0	15	4	3	1	14,000	82
1908												
Jan. 10	26	52	13	0	0	0	6	1	1	0	18,000	84.5

The study of the many blood pictures made from cases together with the clinical data showed that all the where, through several observations, the blood picture shifting to the left without an increase in the number lymphocytes and without a decided leucocytosis, the losis bacilli were either found in the sputum or the showed the clinical signs of tuberculosis. However, where was but a slight shifting to the left with one observation cases sometimes developed into something other than losis. Also a number of cases of poor resolution in gave the tubercular blood picture except that in these number of large lymphocytes usually remained higher tuberculosis and the number of eosinophiles increased. observations led to the conclusion that this blood not of great value in diagnosis except where a number servations could be made. In this case then, Arneth's philic blood picture which takes no account of the of the blood can have no diagnostic value. It was this blood picture would prove of great value in cipient cases where the clinical signs were not unfortunately the blood picture is not of much there. The study of these blood pictures did show, 'hese observations upon tubercular patients suggested a ıber of experiments in order to understand as far as possi- the changes which take place in the blood picture. These ›riments were largely carried out at the *Institut für Infec- ·skrankheiten,* Berlin, Germany. A few of the most inter- ng are given below.

. Various fixing and staining experiments.

his was partly suggested by a paper of Pollitzer's which ›eared in 1907 and condemned Arneth's work on the ınd that the lobes of the nucleus were artifacts due to ng and fixing and especially to Wright's method of dif- ntial staining, and also partly suggested in an attempt to the best method for preparing the blood smears so as to the clearest nuclear picture for the blood count. Blood ars from three subjects whose neutrophilic indices were 52 and 60 were spread as thinly and as evenly as possible ı slides, which were absolutely clean and as sterile as con- ›ns permitted. These smears were killed in most of the known cytological methods such as osmic acid, strong ıming, formalin, corrosive acetic, hot alcohol acetic and ›us others, also many were dried and then treated with ıyl alcohol. One slide from each of the above methods of ng was then stained either with Wright's differential blood ı, Jenner's blood stain, methylene blue and eosin, iron ıtoxylin, Delafield's hematoxylin and eosin or with safra- acid fuchsin and orange G. All the slides gave a more or ›lear nuclear picture. Those killed with strong Flemming ›mic acid and stained with iron hematoxylin were the least factory, while those killed with hot alcohol sublimate and ›ed with iron hematoxylin gave the clearest and best nuclear ıre, but of course this method is useless for bedside work. ;ht's was the most satisfactory method because it was the lest and gave a very good nuclear picture as well as ›entiated the different types of leucocytes. Jenner's was useless in that the nuclear picture was poor. The methods gave good nuclear pictures, but not better than ht's. The slides prepared were all counted with a key at at the time they were counted it was not known from ı of the three subjects the smear had been made. All the ›s from any one of the three subjects gave practically the index and the indices for the smears from the three sub- remained the same regardless of how the smear had been and stained. These experiments establish the fact that ate the nucleus of the neutrophile assumes in the killed tained cell is something definite and dependent upon the of the living cell and is not dependent upon the d of preparation. They also show that Wright's method best method of preparing smears for the neutrophilic picture. It was found that blood cells will live on an medium sometimes for several days and in observing living cells it was seen that there are certain times when ıcleus shows up as a clear refractive body surrounded by ınules and in preparations made from the blood of normal made over an agar plate and this is passed over chloroform vapor, the nucleus stands out as above and this preparation will give the same neutrophilic count that the stained preparation from the same subject gives.

Another experiment, that of stretching the nucleus was tried in order to see whether what appears to be one lobe could be drawn apart into several. Pollitzer claims that what appears to be but one lobe of nucleus is really many pieces of the nucleus lying close together (Fig. 24), and made to seem as one by the stain. Slides were scratched with emory paper and then the drop of blood drawn slowly across these scratches in order if possible to catch and tear the cells in the scratches. Although the cells of these preparations were badly torn and stretched the neutrophilic blood picture remained the same as when smears from the same subject had been prepared in the usual manner. Figures 25 and 26 show the neutrophile badly stretched but the nucleus is also stretched and does not give a greater number of lobes than normally.

2. The normal blood picture in man and in guinea pigs.

Smears were prepared from about thirty different subjects whose condition was, as far as known, normal. These different blood pictures gave indices, which varied slightly from each other and yet varied within a small range, which could be called normal. This blood picture corresponds as far as the neutrophiles are concerned very nearly with that of Arneth, which was taken from a large number of cases.

Smears were obtained from a few subjects at different times of day extending over periods of a week or several weeks and in two cases extending at intervals over a period of two years. The results in these cases, show indices, which vary but not definitely enough to be attributed to any one cause and the amount the index varied was usually so slight as to still come within the normal blood picture, which for man is

Class	I	II	III	IV	V	L.L.	S.L.	E.	B.	W.B.C.
	5	22	42	26	5	22	18	1	0	8,000

Ten guinea pigs were studied, for a period of two weeks. Smears were made from drops of blood taken from the ear every two or four hours during each daytime. The results gave a blood picture comparable to that of man except that the neutrophile usually has a larger number of lobes than in man.

Class	I	II	III	IV	V	VI	L.L.	S.L.	E.	B.	W.B.C.	Index
	5	20	34	30	6	5					10,000	42 : 58

The blood picture as shown by guinea pigs varied so much more for the individual animal than it did for the individual person, that in all experiments with guinea pigs smears were made from the animal each day for a week or ten days before the experiment in order to obtain the normal for each animal.

3. The effect upon the neutrophilic blood picture by inoculation of virulent cultures of tuberculosis bacilli.

Guinea pigs were inoculated subcutaneously with varying amounts of an emulsion of a culture of virulent tuberculosis bacilli. They all gave a blood picture much like the one which follows, except, that those animals, which received a larger quantity or a stronger emulsion of the bacilli, showed the typical tuberculosis condition more quickly, while those, which received a smaller quantity or a weaker emulsion reached that condition more slowly.

Guinea Pig VI, Inoculated with 3-Cmm. Strong Emulsion of Tuberculosis Bacilli.

	I	II	III	IV	V	VI	VII	VIII	W.B.C.	Index
Before inoculation..	3	21	32	33	6	5	..	..	9,000	40-60
At time of inocultn.	4	19	36	30	6	5	..	..	9,600	41-59
3 hours after........	2	14	28	34	12	—10	..	..	10 000	30-70
12 hours after.... ..	2	4	16	34	19	10	10	5	10,200	13-87
24 hours after........	2	5	18	36	20	11	6	2	15,000	16-84
48 hours after... . ..	3	9	18	38	16	10	6	..	16 400	21-79
4 days after..........	3	12	38	34	8	3	2	..	14,000	34-66
8 days after..........	4	18	38	30	8	2	..	..	13.200	41 59
12 days after....	8	22	39	24	5	2	..	..	13.400	49-51
18 days after.........	16	38	40	6	..	..	..	..	13,200	74 : 26
21 days after.........	23	45	32	..	..	..	..	..	12.000	84 : 16
25 days after.........	24	53	23	..	..	..	..	..	13,000	87 : 13

Killed—Lungs, liver, and spleen full of tubercles.

These blood pictures show that within a few hours after the inoculation there is an increase in the number of neutrophiles with the larger number of lobes to the nucleus, *i. e.*, the blood picture shifts to the right, and then follows an increase in the number of leucocytes. The shifting to the right of the blood picture remained a few days and then gradually returned to normal. After ten days or two weeks, in some cases longer, the number of lobes of the nucleus began to decrease, *i. e.*, the blood picture began to shift to the left while the number of leucocytes remained about the same or increased very much in dying cases. This condition continued until there were present in the blood only those neutrophiles with a nucleus of one, two or three lobes.

4. Blood on agar media with tuberculosis bacilli.

In 1908 it was found that bone-marrow cells, or blood cells will live and divide when kept on an agar medium (agar 0.5 gm., bouillon 20 cc.+Locke's sol. 80 cc.) in a Petri dish at 37° C.

A large drop of fresh flowing human blood was placed on an agar plate; to one side of the drop was placed a very small point of virulent tuberculosis bacilli. The agar plate was then kept at 37° C. and smears were made every five minutes from the side of the drop next to the bacilli as well as from the side away from the bacilli. The blood pictures showed an increase in the number of lobes of the nucleus of the neutrophiles from the side of the drop which touched the bacilli in as short a time as 10 or 15 minutes, while the nucleus of the neutrophiles from the side away from the bacilli remained normal. Leucocytes washed free from the plasma by the same method as is used in the opsonic work give the same results as the blood leucocytes.

5. Neutrophilic blood picture in the opsonic work with tuberculosis bacilli.

Many of the slides studied were obtained through the courtesy of Dr. Park of the Board of Health, New York City, and others were prepared by the observer. A standardized emulsion of dead bacilli was used with washed leucocytes and incubated 15 minutes at 37° C. In all cases the blood picture from these smears showed a decided increase in the number of lobes of the nucleus of the neutrophiles. Neutrophiles with nuclei of 6, 8, 10, 12 and in one case 16 lobes were found Figs. 27 and 28). On the other hand sterile washed leuco without the addition of the bacilli, incubated 15 minutes not undergo any change with regard to the neutrophilic picture.

An interesting observation in this experiment is that neutrophiles taken from tubercular subjects show a great ference in their ability to react to the tuberculosis baci this manner, which shows itself by an increase in the nu of lobes of the nucleus of the neutrophile. Washed leuco from a subject in an advanced stage of tuberculosis d react at all. The fact that neutrophiles from different react in different degrees shows that the serum of the b not the only important factor in the greater or less resis of the individual to bacteria and quite agrees with the ar ment presented by Vietch, in his paper on a new op method, that it is a surer as well as a simpler method to the leucocytes from the same individual as the serum tained, on the ground that the serum is but one part of blood, while the whole blood is concerned in the resis Although it is at present impossible to say just what this cha of the nucleus of the neutrophiles means, the fact that it change at all, shows that the neutrophile is sensitive to its vironment and probably plays an important part in the re ance. It is possible that this may show what Arneth cla *i. e.*, that the older forms are used up by coming in co with the bacilli. However, this reaction is in no way degenerative fragmentation, as may be seen from Figs. 2 28. The nucleus of 8 or 10 lobes is as healthy looking as one of 3 or 4 lobes.

6. Effect of contamination.

Blood drawn from the end of a finger purposely made and smeared on a slide, which was not clean, gave a b picture which showed a slight increase in the number of of the nucleus of the neutrophile. Blood was drawn fr sterile finger and placed both in small glass chambers, w were sterile and in others, which were dirty and incu 10 minutes. That in the sterile chambers gave a n neutrophilic blood picture while that in the dirty cham gave a blood picture in which some of the neutrophiles nucleus of 8 or 10 lobes (Figs. 29 and 30).

Guinea Pig X developed an open abscess at the point of entra the needle, and the subsequent blood pictures instead of rese those of the tubercular guinea pig showed a decided shifting right, due to the infection with a pyogenic bacterium.

7. Effect of inoculation with snake venom.

Guinea pigs or rabbits were inoculated with small quan of snake venom and smears made from blood from the ea from the bone-marrow cells. The blood pictures from smears showed all the neutrophiles with nuclei of man and often so many lobes that the nuclei had the appear a rosette.

The conclusions from these experiments are, first, th neutrophile is a delicate organism, which reacts quic definitely to its environment and that this reaction ca measure be judged by the condition of the nucleus, i.

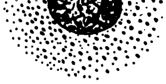


FIG. 1

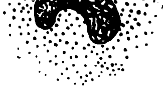


FIG. 2

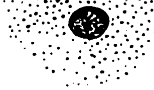


FIG. 3

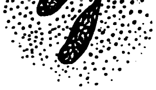


FIG. 4

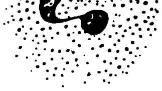


FIG. 5

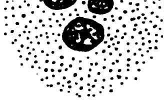


FIG. 6

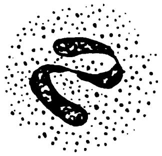


FIG. 7

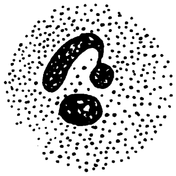


FIG. 8

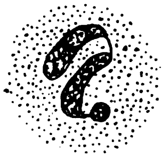


FIG. 9

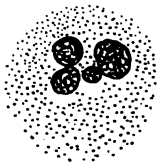


FIG. 10

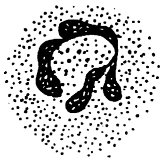


FIG. 11

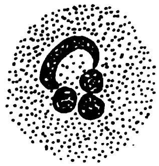


FIG. 12

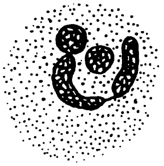


FIG. 13

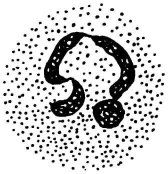


FIG. 14

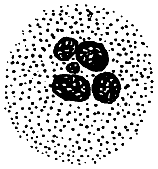


FIG. 15

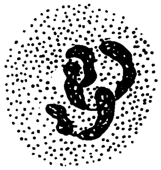


FIG. 16

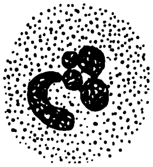


FIG. 17

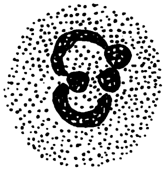


FIG. 18

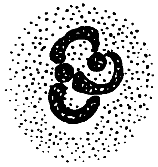


FIG. 19

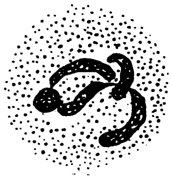


FIG. 20

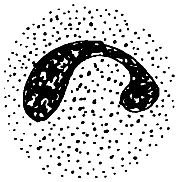


FIG. 21

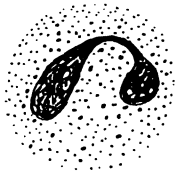


FIG. 22

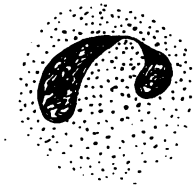


FIG. 23

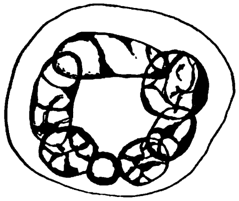


FIG. 24

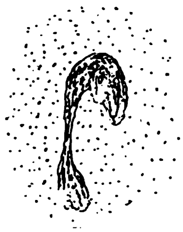


FIG. 25

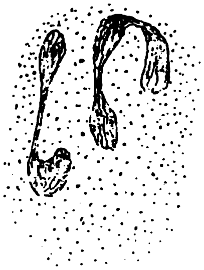


FIG. 26

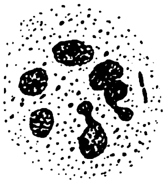


FIG. 27

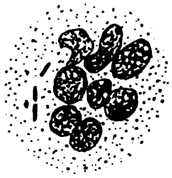


FIG. 28

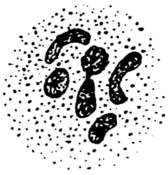


FIG. 29

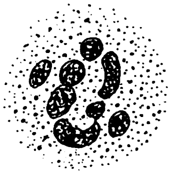


FIG. 30

DESCRIPTION OF FIGURES.

igs. 1-20. Neutrophiles whose nuclei show the number of pieces rding to the classification of Arneth's blood picture.

ig. 21. Neutrophile with a bent nucleus, which is counted as one

igs. 22 and 23. Neutrophiles with a bent nucleus, which is counted wo lobes.

Fig. 24. Drawing taken from Pollitzer's paper to show many pieces of the nucleus.

Figs. 25 and 26. Torn neutrophiles with stretched nuclei.

Figs. 27 and 28. Neutrophiles with many lobed nuclei ingesting tubercle bacilli.

Figs. 29 and 30. Neutrophiles with many lobed nuclei due to contamination.

probably indicates some immediate reaction of the neutro-
iles to a change in their environment, such as snake toxin
the presence of some bacteria. Third, that when the neutro-
iles have nuclei with fewer lobes than normal, they are prob-
ly reacting slowly to some change in their environment, so
ıt the neutrophiles with the larger number of lobes of the
cleus are used up and only those with the fewer lobes are
t in the circulating blood or else that the neutrophiles fail
react in such a way as to cause a change in the nuclei and
remain in almost the same condition as that in which they
ered the blood. Fourth, that the neutrophilic blood picture
lex, shows the condition of the nuclei of the neutrophiles and
ce the condition of the nucleus is probably an indication of
condition of the neutrophiles of the blood, we can judge to
ne degree by the means of the neutrophilic index of the con-
ion of the patient.

In the spring of 1910, Dr. Miller turned over to Mr. C. J.
olet, an expert statistician, all the blood pictures as well as
the clinical evidence upon the cases observed at the Bellevue
spital and from this data Mr. Diolet formed a number of
istics and charts, which will appear in a paper in collabora-
1 with Dr. Miller. A few of the most interesting of these
briefly quoted below.

. The number of leucocytes in incipient tuberculosis is be-
en 9874 and 10,209; while this is slightly higher than most
ervers have found, it is not markedly different. There is a
inct increase in the number of leucocytes with the progress
he disease. Moribund cases show a marked leucocytosis of
300. The number of leucocytes in tuberculosis is
tself of much prognostic value since in these observations
r number corresponds with the subsequent (2 years)
ory.

. The percentage of neutrophiles varies from 64.4 in non-
ercular cases to 78.5 in dying tuberculosis cases. This in-
se of the neutrophiles in the more unfavorable cases is very
ked and indicates an unfavorable prognosis.

. The large lymphocytes according to the statistics show
pparent relationship with the progress of the disease.

. The small lymphocytes on the other hand did show a very
connection with the course of the disease and this connec-
might of itself be used as a means of prognosis. In non-
rcular cases and in incipient cases, those cases with good
nosis and those cases whose subsequent history showed im-
ement gave between 9 and 11 per cent of small lymphocytes.
more advanced cases show between 4.1 and 6.2 per cent,
e the moderately advanced cases and those with doubtful
nosis stand between and have between 7.5 and 7.9 per cent.

The eosinophiles decrease with the progress of the disease
l in dying cases they are entirely absent.

The basophiles give no definite results.

The neutrophilic blood picture was represented only by
ndex. The average index for non-tubercular cases is 54-46,
far-advanced cases 75.25 and all stages in between have a
esponding shift to the left in the index. The changes of the usual clinical signs and symptoms. In diagnosis the usefulness of the neutrophilic blood picture is not great when taken by itself as other conditions may give a slight shifting to the left, but when considered in connection with the other blood cells and when more than one observation is made, it may be of diagnostic value. In prognosis, however, both at the time of examination and during the course of the disease, the degree of shifting to the left is an exceedingly sensitive indication of the resisting power of the individual and of the progress of the disease.

Cases with slight lesion but unfavorable blood picture almost invariably do badly, but, on the contrary, those with extensive lesions and fairly good blood picture show a marked tendency to resist the disease. Moreover, it has been found during the clinical observation of a case that its real progress, in one direction or the other, can usually be more accurately anticipated by the change in the blood picture than by any other clinical means. Even clinically apparent cures are insecure unless the blood picture has come to approach the normal.

	W.B.C.	Neutrophiles	L.L.	S.L.	E.	B.	Index
1. Non-tubercular cases.							
	10,209	64.4	17.5	13.8	5.8	.53	54-46
2. Incipient tuberculosis.							
	9,874	72.4	14.4	9	3.7	.52	64 36
3. Advanced tuberculosis.							
	10,200	74	15.2	7.9	2.4	.52	67-33
4. Far advanced tuberculosis.							
	13,208	77.9	13.9	6.2	1.5	.44	75-25
Cases with good prognosis.							
	9,398	71.8	14.8	9.1	3.7	.53	60-40
Cases with poor prognosis.							
	12,488	77.1	13.4	7.5	1.6	.35	72-28
Cases which showed subsequent improvement.							
	9,323	71.6	14.9	9.9	3.0	.56	60-40
Cases which subsequently did badly.							
	13,897	77.3	14.5	5.9	1.86	.43	75-26

Through the kindness of Dr. George Lockwood and Dr. William Draper, of the Bellevue Hospital, a number of observations were made in connection with Dr. J. Alexander Miller upon cases of pneumonia and later through the kindness of Dr. Lewellys F. Barker, the same work was continued at the Johns Hopkins Hospital. So far the results have not proved definite from the statistic side, but in the individual case it is of prognostic value; especially is it of value in determining whether a case of delayed resolution is tubercular or not. Some cases showed a marked shifting to the right and the lobulation of the nucleus reached 7 or 8 pieces. Such cases showed purulent infection at the post mortem examination. The eosinophiles remain normal during acute stages, but increase afterwards, especially in cases of delayed resolution.

Most cases showed a moderate shifting to the left of the neutrophilic blood picture, giving an index anywhere from 60-40 to 80-20, which index tends to return to normal upon defervescence with good resolution.

In six cases of delayed resolution the index 64-36 continued high, while the number of leucocytes decreased to normal or below normal, and the number of large lymphocytes decreased. These cases gave a typical tuberculosis blood picture and later the bacilli were found in the sputum.

In the three cases of appendicitis, the blood picture showed a decided shifting to the right, and neutrophiles with nuclei of 6, 7 and 8 lobes were present. Upon operation these cases showed a purulent condition of the appendix, while in one case where the blood picture was practically normal the operation showed no infection of the appendix.

Several cases of abscess showed the shifting to the right in the early stages. The following are a few typical blood pictures.

	Class I	II	III	IV	V	VI	VII	L.L.	S.L.	E.	B.	W.B.C.	Index
Normal.......	5	22	42	26	5	..	..	20	10	1	0	8,000	48-52
Tuberculosis..	14	40	36	10	..	..	..	18	5	1	0	12,000	72-28
Pneumonia...	20	40	30	10	..	..	..	32	8	1	0	18.000	75-25
Pus case	4	14	18	32	21	9	2	12	6	1	1	24,000	27-73

The conclusions from these observations may be briefly stated as follows:

The neutrophile is an organism, which reacts quickly and definitely to its environment and the condition of the nucleus as shown by the number of lobes, may be taken as an indication of the condition of the neutrophile. Under normal conditions the nucleus does not show more than five lobes, but the presence of certain abnormal conditions may cause it to show as high as 8 or 10 lobes, while certain other conditions, such as tuberculosis, may prevent it from having more than 1, 2 or 3 lobes. These changes of the nucleus together with the other blood cells and the number of white blood cells form a picture, which can be used to determine the condition of the patient.

This neutrophilic blood picture together with the differential blood count is of great value in prognosis in tuberculosis, but
not of much value in diagnosis. It is of value in determin
the presence of pyogenic bacteria in pneumonia or an a
and may be of value in detecting a purulent condition of
appendix. In connection with the number of white blood c
and the number of lymphocytes it is of value in distinguishi
between a case of poor resolution in pneumonia and tuber
losis.

It is of especial value in the prognosis of any disease wh
it is of use to determine the metabolic activity of the pati
or the resistance to disease as any condition of lowered vital
is quickly detected by this blood picture.

BIBLIOGRAPHY.

1. Arneth, J.: Die Lungenschwindsucht, etc. Leipz., 1905. J.
Barth.

2. Bushnell, G. E., and Treuholtz, C. A.: Med. Rec., 1908, LXI
471.

3. Greenwood, M.: J. Physiol., 1886, VII, 253; 1887, VIII, 2
1890, XI, 573.

4. Holmes, A. M.: Med. Rec., 1896, L, 325; 1897, LI, 369;
Am. M. Ass., 1897, XXIX, 828.

5. Jacquet, A.: Arch. f. Exper. Path. u. Pharmakol., 18
XXIX, 386.

6. Korschelt, E.: Naturwissensch. Rundschau, 1887, 409. Zo
Jahrb. Anat. u. Ontog., 1889, VI.

7. Loeb, J.: Arch. f. Entwcklngsmchn. d. Organ, 1899, VII
689.

8. Lillie, R. S.: Am. J. Physiol., 1902, VII, 412-421.

9. Maximow, A.: Arch. f. Mikr. Anat., 1901, LVIII, 1, 5

10. Mathews, A. P.: J. Morph., 1899, XV, Suppl., 172.

11. Pollitzer, H.: Deutsches Arch. f. klin. Med., 1907, XCII, 1

12. Spitzer, W.: Arch. ges. Phys., 1897, LXVII, 615.

13. Vietch, R. M.: J. Path. & Bacteriol., Gt. Brit. & Ire., 19
XII, 353.

NOTES ON NEW BOOKS.

A Text-book of Gynecological Surgery. By Comyns Berkeley, M.D., M.R.C.S. (Eng.), etc., and Victor Bonney, M.D., F.R.C.S. (Eng.), etc. *(New York: Funk & Wagnalls Co., 1911.)*

This work describes briefly but clearly the technique of the various gynecological operations as practiced by one of the leading schools of English gynecologists. It discusses also operative indications and dangers, as well as ante-operative preparation and post-operative treatment and complications. There are numerous black-and-white schematic illustrations and a considerable number of colored plates, all of which are of mediocre artistic merit, but nevertheless are quite helpful in elucidating that text. The authors have succeeded admirably in presenting a very complete treatise in a condensed and readable form, which will doubtless be gratefully received by the American profession.

E. H. R.

Dyspepsia: Its Varieties and Treatment. By W. Soltau Fenwick, M.D. (London). Illustrated. Price, $3.00 net. *(Philadelphia and London: W. B. Saunders Company, 1910.)*

This work treats of disorders which are certainly frequent enough to justify a special discussion of their features. One searches at once for a definition of the term dyspepsia, but the author, probably very wisely, does not give one in set words.
Perhaps he considered that the text sufficiently described wh
he included under the term. The author points out cert
things which are essential to keep in mind if one is to ha
any clear ideas of this subject. One is that a disorder of dig
tion is rarely due to primary disease of the stomach. This
one point often entirely disregarded in practice and when it
more fully recognized there will be a falling off in the use
many drugs given for gastric disorders. In this connecti
however, the author does not seem to attach enough importan
to gastric derangement secondary to general nervous dist
ance. He gives the principal place to primary disease of t
liver, pancreas or bowel. These play a part but it is doubt
if it is the main one. Then he takes a fling at the terminol
employed for gastric disorders; with this we are in har
agreement. He seems to have written a volume on gastric d
order without coining any new terms for which commenda
is due and it is to be hoped the example will be followed
those who come after. Of intestinal indigestion he says t
it "almost defies chemical analysis," which is a comfor
statement when we are in despair over our inability to prop
classify examples of it.

Of this work as a whole it can be said that the disc
is well done, the descriptions accurate and the treatment
ble. However, there are some statements which should be
fied. Thus it is not safe to make a diagnosis dogmatic

orrect. The use of the term gastric neurasthenia is not to be ommended. Why not as well speak of gastric psychasthenia r gastric hysteria? In the discussion of the so-called gastric eurasthenia, the author seems to put the cart before the horse. 'hus the text suggests that the often accompanying mucous olitis is in consequence of the gastric disorder, whereas both re usually results of a common cause.

There is an excellent section on dyspepsia which occurs condary to other diseases with particular reference to the isturbances in tuberculosis. The discussion of the digestive isorders of infancy and old age is useful and worthy of special ote, especially the latter section. The care of the health of e aged is worthy of more attention than it usually receives.

Altogether this work is to be commended as an excellent iide in the management of the various forms of dyspepsia. The eatment advised is usually sound but there are some points hich might be given more emphasis. For example the need attention to the teeth hardly seems to have received sufficient ention. Often a dentist is needed more than a physician. gain the question of proper chewing of the food would seem orthy of more notice than it receives. But these suggestions ust not be regarded as serious criticisms and Dr. Fenwick is be congratulated on the excellent volume which he has writ- n on a difficult subject.

e Practice of Medicine: A Guide to the Nature, Discrimination and Management of Disease. By A. O. **Kelly**, A. M., M. D., Assistant Professor of Medicine in the University of Pennsylvania and Assistant Physician to the University Hospital, Philadelphia. Illustrated. (*Philadelphia and New York: Lea & Febiger. 1910.*)

This excellent text-book is a monument to the industry and ility of its author, who was so recently cut off at the height an active and successful medical career. Although a comratively young man, few clinicians were better equipped to ite a text-book on medicine. Dr. Kelly was a keen clinical server and his bedside training was supported by an extensive hological experience in the autopsy room. His thorough niliarity with medical literature has enabled him to incorrate in this volume of 945 pages, practically all the important ent contributions to our knowledge of medical affections. hough the author states that the volume is intended especially medical students and the junior practitioners of medicine, ertheless the teacher of medicine can turn to its pages with ertainty that he will find the most modern views concerning etiology, symptomatology, pathology and management of various medical diseases dealt with.

'he subject matter is treated under twelve sections. These arranged in the following order: Infectious Diseases: Inications; Disorders of Metabolism; Diseases of the Ductless nds and of Internal Secretions; Diseases of the Blood and nopoietic System; Diseases of the Circulatory System; Dises of the Respiratory System; Diseases of the Digestive tem; Diseases of the Urinary System; Diseases of the Ners System; Diseases of the Muscles; Diseases of the Bones Joints.

he author has made an interesting subdivision of the infecs diseases. The first takes up the bacterial infections, which ude the various diseases which are now known to be due to ecific organism. Then come the non-bacterial fungus infecs including such conditions as actinomycosis and pulmonary ergillosis. The subdivision of zoöparasitic infections eme the protozoan infections such as amœbiasis, syphilis and aria and the metazoan infections under which are described intestinal, visceral and cutaneous parasitic diseases.

'ith our advancing knowledge, one of the great difficulties

reasonable bounds as to size. This the writer has been able to do. While some diseases are of necessity treated briefly, yet it is difficult to find a single affection that has escaped the writer's attention. The student and practitioner will find this volume a most useful addition to his medical equipment.

The Surgery and Pathology of the Thyroid and Parathyroid Glands. By **Albert J. Ochsner**, A. M., M. D., LL. D., and **Ralph L. Thompson**, A. M., M. D. (*St. Louis: C. V. Mosby Company, 1910.*)

In the preface the authors state that they have planned to bring to the practitioner of medicine and surgery the results of the study of the work of those who have given much time to the development of this special field.

The work of 334 pages is divided into two parts, the first by Dr. Ochsner on the thyroid, the second by Dr. Thompson on the parathyroid glandules. Dr. Ochsner's experience in thyroid surgery has been so large and varied that anything written by him demands the attention of both surgeons and internists. In the first part he discusses the surgical considerations of the thyroid gland, its pathology and the diagnosis and treatment of its diseases, both medical and surgical. Considerable space is devoted to the various operations on the gland, and the technique of these operations is well described and profusely illustrated. Chapters follow on the prognosis in exophthalmic goitre and heredity in goitre.

The second part, by Dr. Thompson, deals with the anatomy, histology and tumors of the parathyroid glandules, and their importance in operations upon the thyroid gland. Our knowledge of these interesting organs has been brought together by the author in a most concise manner.

The book is well written and will be a great help to those who wish to find a resumé of our knowledge of these organs in a comparatively small space.

Atlas of Microscopic Diagnosis in Gynecology. With Preface and Explanatory Text. By **Dr. Rudolf Jolly**, Priv. Doc. Only Authorized English Translation. By **Dr. P. W. Shedd**. Illustrated. Price, $5. (*New York: Rebman Company, 1911.*)

Familiarity with the normal and pathologic histology of the female organs of generation is of fundamental importance to the gynecologist. Thus, for example, uterine hemorrhage is an exceedingly common symptom, quite often met with independent of any demonstrable gross lesion. In such cases the aid of the microscope must be sought, and forthwith one is confronted by the fact that there is quite a list of endometrial changes capable of producing this symptom, some of which may very closely simulate each other in histological appearance. Unfortunately, the most important diagnosis to be made, namely, that of malignancy, is thus rendered the most difficult. The vital importance and moral responsibility involved in such a determination is, of course, obvious. It seems strange, therefore, that nearly all American works on gynecology, although excellent in other respects, are so conspicuously deficient in microscopic diagnosis. This English translation of Dr. Rudolph Jolly's excellent atlas will on this account prove most acceptable. The bulk of the work, happily, is concerned with physiological and pathological changes in the endometrium, which is of paramount practical importance. The plates are accurate reproductions of microscopic preparations, and are of an unusually high order of excellence. The descriptions, although a bit stilted in phraseology, are judiciously short and comprehensive. Dr. Shedd is due the gratitude of the entire profession for his labor, but more especially of those whose reading is of necessity confined to the English language. The book should meet with ready acceptance.

E. H. R.

Interne Klinik der Bösartigen Neubildungen der Bauchorgane. Von Priv.-Doz. Dr. Rudolf Schmidt. Price, Mk. 14. (*Berlin und Wien: Urban & Schwarzenberg; New York: Rebman Company, 1911.*)

This book is divided into three parts: A, General; B, Special; and C, Case Histories. Parts A and B together cover 175 pages, and Part C about 150. The author lays especial stress on his work on early and differential diagnosis, and also on subjective phenomena, "which are so often precursors of objective findings." In Part B he describes cancer of the stomach (*Magenkrebs*), carcinoma of the large intestine (*Carcinome des Dickdarmes*), primary and secondary cancer of the liver, carcinoma of the gall-bladder, of the pancreas, malignant new growths of the kidney, and atypical malignant tumors of the abdomen. Students who can read German will find this work a useful guide in their study of these varied tumors.

Gynecological Diagnosis. By Walter L. Burrage, A. M., M. D., etc. Illustrated. Price, $6.00. (*New York and London: D. Appleton & Co., 1910.*)

In view of the superficiality, incompleteness and practical worthlessness of many present-day medical works, it is distinctly refreshing to meet with this excellent treatise of Dr. Burrage's. Not only is the book conspicuous for its thoroughness, logical arrangement, clearness and literary excellence, but the author has displayed wise selective judgment in the choice of subject-matter. Every chapter bears the unmistakable earmarks of ripe knowledge and careful preparation. There has been modestly and gracefully incorporated, too, just a satisfying amount of the author's own views and statistics, based upon a large and varied clinical experience, to stamp the book with individuality. While, on the other hand, the numerous references to both the older as well as the very recent literature, at the same time that it adds a further attractive and valuable feature to the work, indicates clearly also the author's breadth of mind and healthy regard for the work of others.

Chapters on diagnosis of vesical, ureteral and rectal disorders, the gynecological affections of infancy and childhood, and on the menopause and old age are very properly included in the work, and are sufficiently full to be both instructive and suggestive.

The chapters on diagnosis of uterine pregnancy, abortion, hydatidiform mole, and on diseases of the breast emphasize not only the close relationship existing between gynecology and obstetrics, on the one hand, and general surgery, on the other, but also the need of constant vigilance on the part of the specialist lest he become narrow and distorted in medical perspective.

The illustrations are well chosen, clear and helpful, and the publishers' work has been well done. There is appended also an excellent index.

Altogether the work speaks most creditably for the scholarship and scientific attainment of its distinguished author, and can be heartily recommended to students, practitioners and specialists alike. It is a distinct addition to gynecological literature and deserves the unstinted support of the profession.

E. H. R.

A Text-book of Mental Diseases. By Eugenio Tanzi, Professor of Psychiatry in the Royal Institute of Higher Studies of Florence. Authorized translation from the Italian by W. Ford Robertson, M. D., C. M., and T. C. Mackenzie, M. D., F. R. C. P. (Edin.) Price, $7.00. (*New York: Rebman Company.*)

Professor Tanzi has been so long known as a leader among the Italian psychiatrists and as one of the editors of the *Rivista di Patologia nervosa e mentale* that this translation of his text-book, representing as it does a summary of his views on the subject, will be welcomed by all those interested in psychiatry as giving a more convenient means of reference than the original work. Certain changes have been made in the translation which make it more suitable for English readers, these being the omission of several descriptions of cases, the substitution of English specimens of handwriting, and the omission of the section dealing exclusively with the administration of lunatic asylums.

The book is divided into twenty-six chapters, the first entitled The Seat of the Psychical Processes, dealing chiefly with anatomical data as shown by anatomy, pathology, and embryology which gives us positive evidence of the existence of psychical centres but which Tanzi qualifies by the statement that "The law that the functional processes are always pluricellular also holds, however, for these centres, as does also the law that every cell has the power of resisting or yielding to stimuli, and of reacting in various though similar ways. Further, the activity of a single cell never corresponds to an imaginable form whether it be of the most elementary or of the most vague symbolical nature, unless it is compounded with that of very many other cells, perhaps thousands, scattered here and there in the brain. For this reason the precise contents of the psychical treasure-house, as also the degree of intellectual activity, will always be an enigma to the anatomist. Only the generic type of the intelligence, the enumeration of the functions that belong to the various cortical centres, and the feebleness or the extraordinary development of a psychical function are problems capable of solution by anatomy, and of being made the subject of future corollaries through the clinical study of mental diseases." By the study of the brains of exceptionally gifted persons, such as orators, musicians, etc., and of the brains of idiots and partial dements we may discern the outlines of a vast scheme of psycho-pathological anatomy, and psychiatry will cross "the narrow strait which separates it from the other departments of clinical science."

In the second chapter on The Causes of Mental Diseases Tanzi avoids any prolonged or statistical discussion and comes to the conclusion that, "among the causes of insanity, the external act more widely than the internal; and among the external causes, somatic disorders and social inequalities are more to be feared than intellectual overstrain, which has no harmful effect if not accompanied by hygienic errors and depressing emotions, and, therefore, also by trophic disturbances of the entire organism." A statement which we believe will not be unqualifiedly endorsed by observers in this country.

The next four chapters deal with Sensibility, Ideation, Memory, and The Sentiments. Chapter VIII with Movements and other External Reactions. In Chapter IX upon the Classification of Mental Diseases Tanzi discusses those of Morselli and Kraepelin, and gives one of his own somewhat similar to the latter's but more simple.

The following chapters deal with Pellagra, Alcoholism, Amentia, Thyroid Psychoses, Progressive Paralysis, Infantile Cerebropathies (acquired idiocy), Cerebropathies of Adults, Affective Psychoses, Neurasthenia, Hysteria, Epilepsy, Dementia Præcox, Sexual Perversions, Constitutional Immorality, Paranoia and Imbecility. Under Amentia are included the exhaustive and infective psychoses, thus making of it a fairly large group. Mania Melancholia and the periodic psychoses are included under the Affective Psychoses. The various obsessions are grouped under Neurasthenia. The chapters on Sexual Perversions and Constitutional Immorality contain many wise reflections which could be read with profit by legislators, magistrates, and those concerned with the administration of laws as well as by the medical profession. Concluding the latter chapter Tanzi says "If alienists would be firm and unanimous in declaring that congenital immorality is an anomaly, and not a disease, ia reassure society, and still be in accord with justice and lence."

ıe final chapter on Asylums opens with an interesting unt of the development of the modern hospital for the ne and contains much wise criticism and suggestion.

ı the whole the book is a valuable addition to psychiatric ature and we should be grateful to the translators for perıing their task so excellently. W. R. D.

akute Leukämie. Von Dr. Albert Herz. Price, Mk. 4.50. (*Leipzig und Wien: Franz Deuticke, 1911.*)

ıis is a monograph of over 160 pages, based on the personal ·vation of eight cases, with five autopsies, of acute leukemia. author worked in Kovác's clinic and Weichselbaum's pathcal institute in Vienna, and in conjunction with the special y of his cases, has gone through all the literature bearing ıe subject, so that his work is very complete. An excellent ography, arranged alphabetically, is to be found at the end s paper. There are no illustrations. The rare opportunity Herz has had to follow so many cases to their end makes nonograph of importance to all hæmatologists.

ngitis, Sinus Thombosis, and Abscess of the Brain. By Iohn Wyllie, M. D. Price, $3. (*New York: Paul B. Hoeber, !911.*)

is book is the outcome, so it appears, of reading rather of personal experience, and so lacks exactness and authority. · looking through certain portions of the symptomatology is confused by the absence of any clear cut figure of the se presented. Had the author studied other literature bethe current English magazines he would have written a valuable work. In his bibliography there are but very few ences to foreign sources.

ınts d' Anatomie Pathologique. Par le Dr. L. Bériel. (*Paris: !. Steinheil, 1910.*)

ɜ real workers in pathology who are interested in knowing ıodern French point of view on the elements of this study e glad to have this work. It is mainly intended for students ring for their examination in this branch of medicine in :e and so is intensely practical, all theory and controversy rigidly omitted. It is illustrated, but for the most part rawings are not so good as we are accustomed to in our ican text-books. It is a concise work of about 550 pages, the defects inherent to its presentation and purpose—that ving as a book with which to pass an examination. Writıith this end in view, however, it is excellent, and far betan most of its kind.

)iseases of Infants and Children. By Edmund Cautley, .D. (Cantab.), F. R. C. P. (Lond.), Senior Physician to e Belgrave Hospital for Children, etc. Price, $7. (*New ɔrk: Paul B. Hoeber, 1910*).

ɜ difficult for general text-books to keep apace with the ɔns which are constantly being made to the knowledge of ɜs of children. The writer of the treatise before us has ded in a large measure in collecting into one volume a disı of the various ailments to which children are heirs. the announced object to "describe the conditions in such as to render further reference to other works unnecessary, in the case of unusually rare diseases, has not been fully d," the volume is of interest for the inclusion of an t of many rare conditions generally omitted in text-books.

The impression is given in reading the pages of a carefully prepared summary of the literature but little influenced by the results of the writer's large clinical experience.

Naturally some errors have crept in, as, for example, where on page 49 the globules of cow's milk are said to be 10-15 times as large as those of human milk.

The condemnation, page 51, of laboratory methods in milk modification for the reason that "some babies do badly because of a too low percentage of protein or of fat" is hardly fair to a system which seeks to carry out strictly the physician's orders.

In the discussion of the diarrhœal diseases the reference to the various bacteria, which may play a part in many cases, is inadequate, and the statement that ileo-colitis can only be differentiated from infective diarrhœa by the anatomical changes after death, page 289, is misleading, as the pressure of blood and pus in the injecta indicates in most instances an inflamed or ulcerated bowel wall.

A comparatively large portion of the work is devoted to the consideration of the malformations and congenital defects, and rarer pathological conditions, particularly of the nervous system.

The final section contains a brief but satisfactory reference to the more important affections of the eye, ear and skin.

The treatise as a whole places a valuable text-book in the hands of the advanced student and physician. The publisher's part is well done. One wishes, however, that the size and weight of the volume had been lessened by thinner and lighter paper.

J. H. M. K., Jr.

1000 Surgical Suggestions: Practical Brevities in Diagnosis and Treatment. By Walter M. Brickner, B. S., M. D., etc. Fourth American Edition. Price, $1. (*New York: Surgery Publishing Company, 1911.*)

The popularity of this work is an unfortunate index of the mental attitude of a large number of surgeons, who expect to learn surgery by simple rules rather than by a thorough grounding in the science. If such books find readers and publishers, this one can be recommended as giving what is apparently wanted by many.

Report from the Pathological Department, Central Indiana Hospital for Insane. Vol. II, 1906-07, 1907-08; Vol. III, 1908-1909. (*Indianapolis: Wm. B. Burford, Contractor for State Printing and Binding.*)

One of the best evidences of the advance in medical education and improvement in hospitals of all sorts is the recognized value of the pathologist to all institutions treating the sick; and it is a noteworthy fact that the insane hospitals throughout the country are now appointing pathologists on their staffs, and publishing annual reports from the pathological and clinicopathological departments. Every endeavor of this nature is worthy of commendation and imitation; and the publication of the above reports will help all the physicians in Indiana and elsewhere who are awake and eager to seize the opportunities for instruction that are afforded them. They may not have many readers, but capable young physicians will be more attracted to look for situations in the State hospitals if they know their work is to be supported by pathological investigations; and the present residents will be kept up to a higher level of work. It is only the dullest interne—and he should not have the position—who is not interested when he is able to secure an autopsy on a patient who has been under his observation. In addition to this the accumulating value of pathological reports on autopsies among the insane is very great, even when the findings may be to use the common but very poor expression "negative." These two volumes contain much of interest to alienists, and physicians in hospitals for the insane, both on the clinical and pathological aspects of the work in the Central Indiana Hospital, and we are glad to note that the third volume is twice as large as the second, showing how well the staff has made use of its material. We hope that Dr. Edenharter, the superintendent, will be able to continue to secure the needed aid from the State legislature to pursue the work already so well begun.

Disease in Bone and its Detection by the X-Rays. By Edward W. H. Shenton, M. R. C. S., etc., with Illustrations. Price, $1.60. (*London: Macmillan & Co., Ltd., 1911.*)

This is a useful little monograph, with some beautiful X-ray photographs to illustrate the text. The author has not attempted to write a text-book in any sense of the word, but only to give a few points on the appearance and differential diagnosis, as seen by means of the X-rays, of the following conditions: Inflamation in Bone, Tubercular Disease, Osteo-Arthritis, Growth in Bone, and Osteo-Malacia. For students beginning to work with the X-rays this brief manual should prove distinctly helpful.

A Manual of Practical Inorganic Chemistry Including Preparations and Qualitative and Quantitative Analysis with the Rudiments of Gas Analysis Specially Adapted to Cover Preliminary and Intermediate University Courses and the First Three Stages of the Syllabus of the Board of Education. By A. M. Kellas, B. Sc. (London), Ph. D. (Heidelberg). Lecturer on Chemistry at the Middlesex Hospital Medical School, Formerly Examiner in Chemistry to the Conjoint Board of the Royal Colleges of Physicians and Surgeons. (*London: Henry Frowde, Oxford University Press, 1910.*)

Introduction to Practical Organic Chemistry Including Qualitative and Quantitative Analysis and Preparations with a Special Appendix on the London University Syllabus, and Schemes of Analysis for Stages 1 and 2 of the Board of Education Syllabus. By the same author and from the same publisher. *Oxford Medical Publications.*

As the title and contents show, these volumes, like many of the English text-books, are chiefly designed to prepare students for certain examinations. They are a mixture of specialized text-book and specialized laboratory manual, differing in arrangement from books in use in other countries. The books are well written and the student preparing himself for the specified examinations by their help should acquire much knowledge of the subjects.

E. R.

New Series, No. 41. Scientific memoirs by Officers of the Medical and Sanitary Departments of the Government of India. *Quinine and Its Salts: Their Solubility and Absorbability.* By Captain A. C. MacGilchrist, M. D., I. M. S., etc. Price, 10d. (*Calcutta: Superintendent Government Printing, India, 1911.*)

This is not simply a chemical study of quinine and some of its salts, but a report rather on their physiological aspects, and deals with their proper administration in cases of malarial fever and amebic dysentery. The results found by Dr. MacGilchrist are, in large part, drawn from experiments on guinea pigs, but this does not vitiate their importance. As the correct dosage of quinine for patients suffering severely from malaria is always somewhat problematical, this contribution is helpful in explaining why quinine and its salts do not always act as we should like them to do.

New Series, No. 42. Part I. *The Cultivation of the* *Leprosy and the Treatment of Cases by Means of a* *Prepared from the Cultivations.* By Major C. R. I. M. S. Part II. *The Cultivation of the Leprosy* By Captain T. S. B. Williams, M. B., I. M. S. Price (*1911.*)

The cheapness of these important publications is one of striking features, and makes it possible for all students such of them as they desire. The reports are usually well condensed, so that readers are not obliged to wade pages of matter that, as so often happens, had better have omitted. Here we have a distinct brief statement of the of Major Rost and Captain Williams, and their studies read with interest by the many bacteriologists who present very busy in working out the various problems tion to leprosy.

The Experimental Chemotherapy of Spirilloses. By Ehrlich and S. Hata. Translated by A. Newbold and vised by Robert W. Felkin, M. D., etc. Illustrated. *York: Rebman Company, 1911.*)

This work, a small volume of 160 pages, comprises sections. That by Hata, "Experimental Basis of the therapeutics of Spirilla," is a presentation of the results masterly piece of work which from the standpoint of of method employed, for exactness, clearness and of expression, and for the clear cut nature of the proof forward, can well be held up as a standard to be other writers in the field of chemotherapeutics.

The effects of various dye substances and of numerous cals on experimental relapsing fever in mice and fowls is considered, as well as the treatment of syphilitic titis and syphilis of the scrotum in rabbits.

Interesting reports on the action of salvarsan on *spirochæta pertenuis* in the animal body by Henry J. (New York), on the chemotherapy of relapsing fever by (St. Petersburg), and on cases of relapsing fever treated Cairo Infectious Hospital by Dr. Bitter and Dr. Dryer are valuable and interesting additions.

Ehrlich in the "Concluding Remarks" deals in a manner with the development and progress of the work he has been directing for years. He also considers the of dioxydiamido-arsenobenzol, the chemotherapy of diseases, methods and technique in the practical testing of results obtained in chemotherapy and the outlook for progress.

This book can be heartily recommended to laboratory interested in experimental therapeutics and to all medicine.

L. G.

Common Disorders and Diseases of Childhood. By George Frederick Still, Professor of Diseases of Children, King's lege, London, etc. Second Impression. (*London: H. Oxford University Press, 1910.*)

This useful work is not intended to be an exhaustive of all the morbid conditions occurring in childhood, but is a terse and interesting account of the more usual which have come under the writer's notice in a large and varied clinical experience. In a measure the makes available to a larger number of students and than could afford in person the bright and sensible teaching for which the writer is so well known. Any ing the pages must wish to be able to come under the instruction of so wide-awake and interesting a teacher.

references to the work of others, particularly .vestigations outside of England, are rarely given.

.e first six chapters are largely devoted to a discussion of ıt feeding. The importance of breast nursing is, of course, ıasized, and the resources that are at hand to render a ı mother's milk more digestible for her child are carefully ıerated.

e methods of modifying cow's milk for the infant are ently practical, although they might be considered old oned and inaccurate by more radical advocates of "perıge feeding."

e misses any allusion to the caloric needs per given weight e infant, and the danger from carbohydrate and fat injury ving at present so much attention abroad almost escapes ıent.

e writer warmly advocates the boiling or better pasteurizof milk for infants during the hot season. This view prenates in America.

e tartrated whey made from precipitating the curd with a mal amount of tartaric acid, is cheap and has been found ceable in many cases. It deserves wider use in this country. use of condensed milk and other patent foods for long ds is properly condemned on the basis of long clinical ·ience.

e chapters on rickets and scurvy are richly suggestive, alh the theory that the use of some cereal may be the chief of rickets is hardly tenable, and the relation of impure o rickets is underestimated.

The chapter on colic, including the diagnosis and treatment of its various forms, will prove helpful to many readers.

The relation of certain obscure ailments in older children to dental caries is given the prominence it deserves.

In the perplexing group of diarrhœal disorders the writer is careful not to make any fine distinctions. The significance of blood and pus in the dejecta, indicating usually an ulcerated condition of the bowel, is not sufficiently emphasized, and the statement that there are very few cases of infantile diarrhœa in which the use of opium is not indicated might be misleading. Certainly in many cases it is contraindicated.

The discussion of the rheumatic affection of children, a condition perhaps more prevalent in England than elsewhere, is particularly clear and helpful. Attention is called to the importance of recognizing as rheumatic many vague muscular pains, of looking carefully and at the right places for the fibroid nodules as well as to the frequent affection of the heart.

The various nervous and mental abnormalities of children receive rather extended consideration in the closing chapters. One would like perhaps to find a somewhat fuller description of the fundamental pathological findings in these and other conditions. This is, however, not the writer's intention. It is rather to confide to the reader the kind of diseases which for many years have been coming under the care of a skillful observer, and to outline what therapeutic measures have proved in his hands most effective in their treatment. In accomplishing this endeavor an exceedingly interesting and valuable treatise, if not a profound one, on the common disorders of childhood has been placed at the disposal of the profession. J. H. M. K., Jr.

BOOKS RECEIVED.

nal Hygiene and Physical Training for Women. By Anna I. Galbraith, M. D. Illustrated. 1911. 8vo. 371 pages. W. . Saunders Company, Philadelphia and London.

al Celiotomy. By S. Wyllis Bandler, M. D., with 148 riginal illustrations. 1911. 8vo. 450 pages. W. B. Saunders ompany, Philadelphia and London.

Board Questions and Answers. By R. Max Goepp, M. D. econd edition, thoroughly revised. 1911. 8vo. 715 pages. '. B. Saunders Company, Philadelphia and London.

t-book of Surgical Anatomy. By William Francis Campell, M. D. Second edition, revised with 319 original illusations. 1911. 8vo. 675 pages. W. B. Saunders Company, hiladelphia and London.

ples and Practice of Modern Otology. By John F. Barnll, M. D. and Ernest de Wolfe Wales, B. S., M. D. With 4 original illustrations, many in colors. Second edition, oroughly revised. 1911. 8vo. W. B. Saunders Company, ıiladelphia and London.

ostic and Therapeutic Technic. A Manual of Practical ocedures Employed in Diagnosis and Treatment. By Alrt S. Morrow, A. B., M. D. With 815 illustrations, mostly iginal. 1911. 8vo. 775 pages. W. B. Saunders Company, iladelphia and London.

itise on Diagnostic Methods of Examination. By Prof. Dr. ırmann Sahli. Edited, with additions, by Nathaniel Bowch Potter, M. D. Second edition, revised. Authorized ınslation from the fifth revised and enlarged German ition. 1911. 8vo. 1229 pages. W. B. Saunders Company, iladelphia and London.

A Hand-book of Practical Treatment. By Many Writers. Edited by John H. Musser, M. D. and A. O. J. Kelly, A. M., M. D. Volume II. 1911. 8vo. 865 pages. W. B. Saunders Company, Philadelphia and London.

Enlargement of the Prostate, its Treatment and Radical Cure. By C. Mansell Moullin, M. D. Oxon., F. R. C. S. Fourth edition. 1911. 8vo. 176 pages. P. Blakiston's Son & Co., Philadelphia.

What Shall I Eat? A Manual of Rational Feeding. By F. X. Gouraud. With a Preface by Prof. Armand Gautier. Only authorized translation into the English language by F. J. Rebman. 1911. 12vo. 379 pages. Rebman Company, New York.

The Anatomic Histological Processes of Bright's Disease and Their Relation to the Functional Changes. Lectures delivered in the Russell Sage Institute of Pathology, City Hospital, New York. During the Winter of 1909. By Horst Oertel. Illustrated. 1910. 8vo. 227 pages. W. B. Saunders Company, Philadelphia and London.

The Experimental Chemotherapy of Spirilloses (Syphilis, Relapsing Fever, Spirillosis of Fowles, Frambœsia). By Paul Ehrlich and S. Hata. With Contributions by H. J. Nichols, J. Iversen, Bitter, and Dreyer. Translated by A. Newbold, and revised by Robert W. Felkin, M. D., F. R. S. E., etc. With 34 tables in the text and 5 plates. 8vo. 181 pages. Rebman Company, New York.

Transactions of the College of Physicians of Philadelphia. Third series. Volume the thirty-second. 1910. 8vo. 442 pages. Printed for the College, Philadelphia.

New and Non-official Remedies, 1911. Containing Descriptions of the Articles which have been Accepted by the Council on Pharmacy and Chemistry of the American Medical Association, Prior to Jan. 1, 1911. 12mo. 282 pages. Press of the American Medical Association, Chicago.

Scientific Memoirs. New Series, No. 39. By Officers of the Medical and Sanitary Departments of the Government of India. *The Applicability to Medico-Legal Practice in India of the Biochemical Tests for the Origin of Blood-stains.* By Lieut.-Colonel W. D. Sutherland, M. B., I. M. S. 1910. Fol. 35 pages. Superintendent Government Printing, Calcutta, India.

Scientific Memoirs. New Series, No. 40. By Officers of the Medical and Sanitary Departments of the Government of India. *The Destruction of Fleas by Exposure to the Sun.* By Captain J. Cunningham, M. D., I. M. S. 1911. 4°. 27 pages. Superintendent of Government Printing, Calcutta, India.

Plaster of Paris and How to Use It. By Martin W. Ware, M. D. Second edition, revised and enlarged. 1911. 12 mo. 99 pages. Surgery Publishing Company, New York.

The Life, History, Function and Inflammation of the Appendix. An Address Delivered to the Clinical Society of Manchester, January, 1911. By Edred M. Corner, M. A., M. C., F. R. C. S. 1911. 8vo. 23 pages. John Bale, Sons & Danielsson, London.

A Text-book of Medicine. By Dr. Adolf V. Strümpell. Fourth American edition translated by permission from the seventeenth revised German edition. With editorial notes, additional chapters, and a section on mental diseases by Herman F. Vickery, A. B., M. D. and Philip Coombs Knapp. With six plates, three of which are in color, and two hundred and twenty-four illustrations in the text. Two volumes. 1911. 8vo. D. Appleton and Company, New York and London.

Chemistry of Food and Nutrition. By Henry C. Sherman, Ph. D. 1911. 12°. 355 pages. The Macmillan Company, New York.

Scientific Memoirs, New Series, No. 41. By Officers of the Medical and Sanitary Departments of the Government of India. *Quinine and its Salts: Their Solubility and Absorbability.* By Captain A. C. MacGilchrist, M. A., M. D., M. R. C. P., I. M. S. 1911. 4to. 46 pages. Superintendent Government Printing, India.

Scientific Memoirs, New Series, No. 42. By Officers of the Medical and Sanitary Departments of the Government of India. Part I. *The Cultivation of the Bacillus of Leprosy and the Treatment of Cases by Means of a Vaccine Prepared from the Cultivations.* By Major E. R. Rost, I. M. S. Part II. *The Cultivation of the Leprosy Bacillus.* By Captain T. S. B. Williams, M. B., I. M. S. 1911. 4to. 23 pages. Superintendent Government Printing, India.

Meningitis, Sinus Thrombosis and Abscess of the Brain. With Appendices on Lumbar Puncture and its Uses, and Diseases of the Nasal Accessory Sinuses. By John Wyllie, M. D. [1910.] 8vo. 258 pages. Paul B. Hoeber, New York.

Disease in Bone and its Detection by the X-rays. By Edward W. H. Shenton, M. R. C. S., Eng., L. R. C. P., Lond. With illustrations. 1911. 8vo. 72 pages. Macmillan and Co., Limited, London.

Central Indiana Hospital for Insane. Report from the Pathological Department. Volume II. 1906-07, 1907-08. Volume III. Fiscal year 1908-1909. 8vo. 1910. Indianapolis.

Transactions of the American Pediatric Society. Edited by Linnaeus Edford La Fétra. Volume XXII. 1910. 8vo. 38 pages. 1911. Reprinted from the Archives of Pediatrics, 1910-1911. E. B. Treat & Co., New York.

The Medical Diseases of Children. By Reginald Miller, (Lond.), M. R. C. P. 1911. 8vo. 541 pages. John and Sons, Ltd., Bristol; Simpkin, Marshall, Hamilton & Co., Ltd., London.

St. Luke's Hospital. Medical and Surgical Reports. 1910. 8vo. 253 pages. Frank B. Howard, N. Y.

A Monograph of the Anopheline Mosquitoes of India. By James, M. D., D. P. H., I. M. S. and W. Glen Liston, D. P. H., I. M. S. Second edition, re-written and 1911. 4to. 128 pages. Thacker, Spink and Co., Calcutta

A Practical Medical Dictionary. Of Words Used in with their Derivation and Pronunciation, Including Veterinary, Chemical, Botanical, Electrical, Life and Other Special Terms, etc. By Thomas Lathrop A. M., M. D. Illustrated. 1911. 8vo. 1000 pages. Wood and Company, New York.

Golden Rules of Pediatrics. Aphorisms, Observations, and cepts on the Science and Art of Pediatrics. Practical Rules for Diagnosis and Prognosis, the of Infant Feeding, and the Principles of Scientific By John Zahorsky, A. B., M. D. With an E. W. Saunders, M. D. 1911. 8vo. 284 pages. C. V. Company, St. Louis.

Contributions to Medical Science. By Howard Taylor 1870-1910. Published as a Tribute to His Memory Colleagues under the Auspices of the Chicago Society. [1911.] 4to. 497 pages. The University of cago Press. Chicago, Illinois.

Progressive Medicine. A Quarterly Digest of Advances, coveries and Improvements in The Medical and Sciences. Edited by Hobart Amory Hare, M. D., Leighton F. Appleman, M. D. Volume II. June, 1911. 397 pages. Lea & Febiger, Philadelphia and New York

The Principles and Practice of Bandaging. By Gwilym G. M. D. Third edition, revised. Illustrated from drawings by the author. 1911. 8vo. 128 pages. P. ton's Son & Co., Philadelphia.

American Practice of Surgery. A Complete System of the and Art of Surgery. By Representative Surgeons United States and Canada. Editors: Joseph D. Bryant LL. D.; Albert H. Buck, M. D. Complete in Eight Profusely illustrated. Volume eight. 1911. 4to. William Wood and Company, New York.

Diseases of the Skin. By James H. Sequeira, M. D. Lond. C. P. Lond., F. R. C. S. Eng. With 44 plates in 179 other illustrations. 1911. 8vo. 539 pages. P. ton's Son & Co., Philadelphia.

Internal Secretions from a Physiological and Standpoint. By Isaac Ott, A. M., M. D. 1910. pages. E. D. Vogel, Easton, Pa.

THE JOHNS HOPKINS HOSPITAL BULLETIN.

The Hospital Bulletin contains details of hospital and sary practice, abstracts of papers read, and other the Medical Society of the Hospital, reports of lectures, matters of general interest in connection with the work Hospital. It is issued monthly. The subscription price per year in the United States, Canada, and Mexico; scriptions $2.50.

dosis, Diabetic, 46.
no-carcinoma and mixed-celled sarcoma of the ovary, Com-
ned, 367.
esions, peritoneal, A synopsis of studies on, with a contribution
the treatment of denuded bowel surfaces, 283.
nion, The relation of the, to the origin of human malforma-
ons, 35.
tomist, A Florentine, 140.
erson, D. B., King, J. H., Chaffee, B. S., and Redelings, L. H.,
tudies in glycosuria. I, Ether glycosuria, 388.
erior poliomyelitis—note, 300.
iformin, The use of, in the examination of sputum for the
bercle bacillus, 269.
itoxin, the preparation of, 106.
tic insufficiency, The changes in the circulation in, 197.
as applied to medicine, 350.
aris lumbricoides, The viability of parasitic ova in two per cent
rmalin, with especial reference to, 29.
trian, C. R., Hyperleucocytosis of high grade in broncho-pneu-
onia in a child, 296.
trian, C. R., The viscosity of the blood in health and disease, 9.
eriology of the Baltimore City water, Some observations on
e, 53.
jer, F. H., The stereoscopic X-ray examination of the chest
ith especial reference to the diagnosis of pulmonary tubercu-
sis. (Discussion.) 229.
ey, P., A Florentine anatomist, 140.
zhaf, E. J., The preparation of antitoxin, 106.
ies, F. M., and Moss, W. L., Concerning the Much-Holzman re-
tion, 278.
zol, "C. P.," Investigation into several cases of poisoning by
pors of, 8.
told, W. H., The haven of health, 303.
d picture in Hodgkin's disease, 369.
d picture in tuberculosis, 428.
d platelets and megalokaryocytes in Hodgkin's disease, 114.
d, The clinical value of the determination of the catalytic
tivity of the, 109.
d, The viscosity of the, in health and disease, 9.
dman, W. W., The use of antiformin in the examination of
utum for the tubercle bacillus, 269.
dman, W. W. and Dunham, H. K., The calcification of the
stal cartilages, the cardio-thoracic index and other signs of
lmonary tuberculosis, 247.
dman, W. W., Dunham, H. K. and Wolman, S., The stereo-
pic X-ray examination of the chest with especial reference to
diagnosis of pulmonary tuberculosis, 229.
s received, 32, 99, 164, 314, 439.
ston, Zabdiel, inoculator, and the epidemic of smallpox in
ston in 1721, 315.
tumor, Distortions of the visual fields in cases of, 190.
el, M., In memoriam. August Horn, 21.
el, M., The new department in the Johns Hopkins University.
rt as applied to medicine," 350.
n, G. L. and Moss, W. L., Variations in the leucocyte count
normal rabbits, in rabbits following the injection of normal
se serum, and during a cutaneous anaphylactic reaction, 258.
n, H. A. and Woolley, P. G., An anomalous duct belonging to
urinary tract, 21.
n, T. R., Urinary hyperacidity and its relation to neuritis,
ralgia and myalgia, 1.
ng, C. H., Blood platelets and megalokaryocytes in Hodg-
's disease, 114.

Bunting, C. H., The blood picture in Hodgkin's dease, 39.
Bursitis, Tubercular, 155.
Cancer, angioma and keloid, Employment of radium as an aid to surgery in the treatment of, 127.
Carbohydrate tolerance and the posterior lobe of the hypophysis cerebri, 165.
Carcinoma of the pleura, Primary, 289.
Carcinoma of the right Fallopian tube readily palpable through the abdomen, 20.
Chaffee, B. S., King, J. H., Anderson, D. B. and Redelings, L. H., Studies in glycosuria. I, Ether glycosuria, 388.
Chiari, H., Necrosis of the pancreas, 39.
Chiari, H., Spondylolisthesis, 41.
Chiari, H., The relation of the amnion to the origin of human malformations, 35.
Cholecystitis, Acute, with large amounts of calcium soap in the gall bladder, 223.
Churchman, J. W., Acute cholecystitis with large amounts of calcium soap in the gall bladder, 223.
Churchman, J. W., Primary general peritonitis with isolation of the B. lactis aerogines in pure culture from the peritoneal exudate, 116.
Churchman, J. W., The medical paintings of Velasquez, 383.
Circulation, The changes in, in aortic insufficiency, 197.
Cone, S. M., Tubercular bursitis, 155.
Cullen, E. K., Combined adeno-carcinoma and mixed-cell sarcoma of the ovary, 367.
Cullen, T. S., Carcinoma of the right Fallopian tube readily palpable through the abdomen, 20.
Cushing, H., Goetsch, E. and Jacobson, C., Carbohydrate tolerance and the posterior lobe of the hypophysis cerebri, 165.
Cushing, H. and Heuer, G. J., Distortions of the visual fields in cases of brain tumor, 190.
Cystostomy, suprapubic, A device to aid in keeping the patient dry after a, 160.
Dante Alighieri, Notes on the Divine Comedy of, 333.
Davis, J. S., A further note on the clinical use of scarlet red and its component amido-azotoluol, in stimulating the epitheliation of granulating surfaces, 210.
Davis, J. S., The transplantation of free flaps of fascia, 372.
Deformities, congenital, A case of, 56.
Dernehl, P. H., Medical notes on the Divine Comedy of Dante Alighieri, 333.
Diabetic acidoses, 46.
Diphtheria, The recent epidemic of, in the Johns Hopkins Hospital and Medical School, 357.
Distoma pulmonale in Wisconsin, 112.
Dunham, H. K., and Boardman, W. W., The calcification of the costal cartilages, the cardio-thoracic index and other signs of pulmonary tuberculosis, 247.
Dunham, H. K., Boardman, W. W. and Wolman, S., The stereoscopic X-ray examination of the chest with especial reference to the diagnosis of pulmonary tuberculosis, 229.
Embryology and obstetrics in ancient Hebrew literature, 143.
Embryonic chick tissues, The growth of, in artificial media, agar and bouillon, 126.
Endaortitis, Acute tuberculous, 82.
Erythema multiforme iris during the course of typhoid fever, 79.
Fascia, Transplantation of free flaps of, 373.
Fever, malarial, Grave, with few parasites in the peripheral circulation. Dangers of the intravenous injection of quinine, 101.
Fever, malarial, Intermittent fever in influenza simulating, 101.
Fever, typhoid, Erythema multiforme iris during the course of, 79.
Fitz, Reginald H., Zabdiel Boylston, inoculator, and the epidemic of smallpox in Boston in 1721, 315.

Ford, W. W., The life and work of Robert Koch, 415.

Ford, W. W., The recent epidemic of diphtheria in the John Hopkins Hospital and Medical School; general procedures adopted, 357.

Ford, W. W., Some observations on the bacteriology of the Baltimore City water, 53.

Ford, W. W. and Watson, E. M., The problem of typhoid fever in Baltimore, 351.

Fracture, transverse of the body of the ischium in 1893; terminal displacement in 1902; diagnosticated in 1909, 57.

Gatch, W. D., Report of a case of extensive Tiersch skin graft, 84.

Gelien, J. and Moss, W. L., Serum treatment of hemorrhagic diseases, 272.

Glaser, C., Investigation into several cases of poisoning by vapors of "C. P." benzol, 8.

Goetsch, E., Cushing H. and Jacobson, C., Carbohydrate tolerance and the posterior lobe of the hypophysis cerebri, 165.

Growth of embryonic chick tissues in artificial media, agar and bouillon, 126.

Gudernatsch, J. F., The relationship between the normal and pathological thyroid gland of fish, 152.

Glycosuria, Ether, 388.

Hamman, L. V., The stereoscopic X-ray examination of the chest with especial reference to the diagnosis of pulmonary tuberculosis. (Discussion.) 299.

Hanson, H., Distoma pulmonale in Wisconsin, 112.

Haven of Health, The, 303.

Hazen, H. H. and Parker, H. P., Erythema multiforme iris during the course of typhoid fever, 79.

Hemoglobinuria, paroxysmal; blood studies in three cases, 238.

Hemorrhagic diseases, Serum treatment of, 272.

Herter, Dr. Christian Archibald, 411.

Herter, Christian A., In memoriam, 161.

Herter Foundation, Lecturers on the, 35.

Heuer, G. J. and Cushing, H., Distortions of the visual fields in cases of brain tumor, 190.

Hodgkin's disease, Blood platelets and megalokaryocytes in, 114.

Hodgkin's disease, The blood picture in, 369.

Horn, August. In memoriam, 21.

Hospital staff, December 1, 1910, 67.

Hyperacidity, Urinary, and its relation to neuritis, neuralgia and myalgia, 1.

Hyperleucocytosis of high grade in broncho-pneumonia in a child, 296.

Hypophysis cerebri, the posterior lobe of the, and carbohydrate tolerance, 165.

Influenza, Intermittent fever in, simulating malarial fever, 101.

Ischium, Transverse fracture of the body of the, in 1893; terminal displacement in 1902; diagnosticated in 1909, 57.

Jacobson, C., Goetsch, E. and Cushing, H., Carbohydrate tolerance and the posterior lobe of the hypophysis cerebri, 165.

Jaundice, hæmolytic congenital, Two cases of, with splenomegaly, 85.

Jaundice in pneumonia, Notes on, 408.

Kahn, M., Molière and the physician, 344.

Kidney, Absence of left, patient ductus botalli and chronic peripheral œdema, 56.

King, J. H., Chaffee, S. B., Anderson, D. B. and Redelings, L. H., Studies in glycosuria. I. Ether glycosuria, 388.

Kingsley, C. R., A case of congenital deformities (patent ductus botalli; absence of left kidney and chronic peripheral œdema), 56.

Knopf, S. A., Robert Koch, 425.

Knopf, S. A., The Starnook—A new device for the restcure in the open air and for outdoor sleeping, 301.

Koch, Robert, 425.

Koch, Robert, The life and work of, 415.

Krause, A. K., Experimental studies on tuberculoprotein sensitiveness and their possible applications, 250.

Lenhart, C. H., and Marine, D., On certain limitations in preting thyroid histology, 221.

Leucocyte count, Variations in the, in normal rabbits, in following the injection of normal horse serum, and cutaneous anaphylactic reaction, 258.

Leutscher, J. A., Infection of the urinary tract by the *lactis ærogenes*, with a consideration of the mode of of bacteria into the bladder, 361.

Lewis, M. R., The blood picture in tuberculosis, 428.

Lewis, M. R. and Lewis, W. H., The growth of embryonic tissues in artificial media, agar and bouillon, 126.

Lipectomy, Abdominal, 411.

Liver, Cirrhosis of the, 69.

Liver, Disseminated caseating tuberculosis of the, 146.

Liver, The effort of occlusion of the various hepatic vessels the, 396.

McCrae, T., Typhoid spine; with the report of two additional with bony changes in the vertebræ, 75.

McPhedran, Fletcher, Notes on jaundice in pneumonia,

MacCallum, W. G., The changes in the circulation in sufficiency, 197.

Macht, D. I., Embryology and obstetrics in ancient Hebrew ture, 143.

Magnus-Levy, A., On diabetic acidosis, 46.

Malformations, human, The relation of the amnion to the of, 35.

Mallory, F. B., Cirrhosis of the liver. Five different lesions from which it may arise, 69.

Marine, D. and Lenhart, C. H., On certain limitations in preting thyroid histology, 217.

Martin, Henry Newall, 327.

Molière and the physician, 344.

Morris, R. S., The viability of parasitic ova in two per cent lin, with especial reference to ascaris lumbricoides, 299.

Morris, R. S. and Thayer, W. S., Two cases of congenital tic jaundice with splenomegaly. Observations on jaundice, 85.

Moss, W. L., Paroxysmal hemoglobinuria; blood studies in cases, 238.

Moss, W. L., and Barnes, F. M., Concerning the Much-reaction, 278.

Moss, W. L. and Brown, G. L., Variations in the leucocyte in normal rabbits, in rabbits following the injection of horse serum, and during a cutaneous anaphylactic reaction,

Moss, W. L. and Gelien, J., Serum treatment of hemorrhagic eases, 272.

Much-Holzman reaction, Concerning the, 278.

Nasal septum, The submucous resection of the, 121.

Notes and News, 23.

Notes on new books, Abbott, A. C., The principles of ology, 131;—Abrams, A., The blues, 196;—Adam, C., of treatment for diseases of the eye, 382;—Adami, J. G., ciples of pathology, 412;—Alger, E. M., Refraction and of the eye, 26;—Allen, R. W., Vaccine therapy. Its practice, 32;—Annual report from the chemical works Merck of Darmstadt, Germany, 129;—Arderne, J., fistula in ano, hemorrhoids and clysters, 131;— P. C., An anatomical and surgical study of fractures of the end of the humerus, 97;—Ball, J. M., Andreas reformer of anatomy, 65;—Ballenger, W. L., Diseases nose, throat and ear, 312;—Barnett, H. N. and Accidental injuries to workmen with reference to Compensation Act, 1906, 224;—Barnhill, J. F., The practice of modern otology, 311;—Bean, R. B., The atomy of the Philippine Islanders, 311;—Beck, E. G.

of gynecological surgery, 434;—Bier, A., Text-book
hyperæmia as applied in medicine and surgery, 132;—Bland-
tton, J., and Giles, A. E., The diseases of women, 31;—
nney, S. G., Pulmonary tuberculosis and its complications,
;—Bresler, J., The treatment of syphilis by the Ehrlich-Hata
nedy (dioxydiamido-arsenobenzol), 131;—Brickner, W. M.,
00 surgical suggestions, 437;—Bryant, J. D. and Buck, A.
, American practice of surgery, vi, 98; viii, 381;—Burdetts
spitals and Charities, 1911, 313;—Burrage, W. L., Gynecologi-
l diagnosis, 436;—Cabot, R. C., Differential diagnosis, 196;—
mpbell, W. F., A text-book of surgical anatomy, 228;—Cattell,
W., Lippincott's new medical dictionary, 30;—Cautley, E.,
e diseases of infants and children, 437;—Collected papers
the staff of St. Mary's Hospital, Mayo Clinic, Rochester,
nn., 1905-1909, 196;—Conner, E. M., The life history, function
d inflammation of the appendix, 312;—Cooper, A., The sexual
abilities of man and their treatment, 66;—Coton, F. J., Dis-
ations and fractures, 313;—Crossen, Harry S., Diagnosis and
atment of women, 129;—Crothers, T. D., Inebriety, 195;—
nningham, J., The destruction of fleas by exposure to the
n. Scientific memoirs, No. 40, 312;—Cushny, A. R., A text-
ok of pharmacology and therapeutics, 31;—Davis, G. G., Ap-
ed anatomy. The construction of the human body con-
lered in relation to its functions, diseases and injuries, 97;—
vis, G. G., The principles and practice of bandaging, 382;—
spard, L. L., Text-book of massage, 163;—Dock, G. and Bass,
C., Hookworm disease, 29;—Donahoe, M. F., A manual of
rsing, 98;—Doty, A. H., Prevention of infectious diseases,
3;—Dugan, W. J., Hand-book of electro-therapeutics, 28;—
rle, S. T., Diseas[illegible] the anus, rectum and sigmoid, 196;—
bert S. [illegible] ygiene and sanitation, 30;—Ehrlich,
inated case [illegible] Part 1, vol. i, 97;—Ehrlich, P.
ation, 147. [illegible] ntal chemistry of spirilloses, 438;
sion of the t[illegible] psia; its varieties and treatment, 434;
[illegible] ugh the [illegible] of infancy and childhood, 30;—Fisher,
H., Oe[illegible] tudy of the physiology and the pathology of
ter absorption by the living organism, 162;—Foote, J., The
entials of materia medica and therapeutics for nurses, 30;—
rson, J. G., Remedial gymnastics for heart affections used
Bad-Nauheim, 130;—Gatewood, J. D., Naval Hygiene, 27;—de
vanni, A., Clinical commentaries, 31;—Goepp, R. M., State
ard questions and answers, 311;—Gouraud, F. X., What shall
at?, 412;—Grandon, L. R. G., Surgical after-treatment, 66;—
re, H. A. Modern treatment: the management of disease with
dicinal and non-medicinal remedies, 195;—Hartridge, G.,
lden rules of ophthalmic practice, 131;—Harvey Lectures,
9-10, 128;—Hassard, E. M., Practical nursing, 30;—Hawk,
B., Practical physiological chemistry, 28;—Hecht, A. F., Die
eces des Sänglings und des Kindes; 414;—Herz, A., Die akute
kämie, 437;—Hinsdale, G., Hydrotherapy, 99;—Hirsch-
ler, A. D., Diseases of the heart and aorta, 24;—Hiss, P. H.,
and Zinsser, H., A text-book of bacteriology, 414;—Hollander,
The mental symptoms of brain diseases—an aid to the surgi-
treatment of insanity, due to injury, hemorrhage, tumors
other circumscribed lesions of the brain, 99;—Horder, T.
Clinical pathology in practice, with a short account of vaccine
rapy, 98;—Hoxie, G. H., Symptomatic and regional thera-
tics, 64;—Hurry, J. B., Vicious circles in disease, 162;—In-
national Clinics, 20th s., iii, 30; iv, 98; 21st s., 1911, i, 312;
ames, S. P., Paludism. Being the Transactions for the study
malaria in India, 29;—James, S. P. and Leston, W. G., A
nograph of the anopheline mosquitoes of India, 382;—Jeffreys,
H. and Maxwell, James L., The diseases of China, including
mosa and Korea, 129;—Jolly, R., Atlas of microscopic diag-
is in gynecology, 435;—Jordan, E. O., A text-book of general

chemistry, 438;—Kellogg, J. H., Rational hydrotherapy, 25;—Kelly, A. O., The practice of medicine, 435;—Kerr, Le G., The care and training of children, 129;—Keyes, E. L., Diseases of the genito-urinary organs, 413;—Kidd, F. S., Urinary surgery, 65;—Kirmisson, E., A handbook of the surgery of children, 131;—Kolle, F. S., Plastic and cosmetic surgery, 313;—Krause, F., Surgery of the brain and spinal cord, 225;—Lea, A. W. W., Puerperal infection, 227;—Lejars, F., Urgent surgery, ii, 228;—Litora aliena, 311;—London, E. S., Das Radium in der Biologie und Medizin, 312;—Longyear, H. W., Nephrocoloptosis, 64;—McBride, C. A., The modern treatment of alcoholism and drug narcotism, 129;—McCay, D., Investigations on Bengal jail dietaries with some observations on the physical development and well-being of the people of Bengal. Scientific Memoirs. New series No. 37, 67;—McFarland, J., A text-book of pathology, 31;—MacGilchrist, A. C., Quinine and its salts. Scientific Memoirs, New Series, No. 41, 438;—Maddox, E. E., Golden Rules of refraction, 24;—Manquat, A., Principles of therapeutics, 97;—Martindale, W. H., Salvarsan. Its chemistry, pharmacy and therapeutics, 131;—Medical annual, 227;—Merck's Manual of the materia medica, 412;—Moore, B., The dawn of the health age, 130;—Morison, R., An introduction to surgery, 97;—Morris, Robert T., Dawn of the fourth era in surgery and other short articles previously published, 97;—Mumford, J. G., The practice of surgery, 313;—Murray, R. W., Hernia: its cause and treatment, 28;—Musser, J. H. and Kelly, A. O. J., A handbook of practical treatment, 195;—Nathan, R., Thornhill, H. R., and Rogers, L., Report on the measures taken against malaria in the Lahore Cantonment, 27;—Neuberger, M., History of medicine, i, 163;—New and non-official remedies, 312;—Nothnagel, H., Practice of medicine. Diseases of the intestines and peritoneum, 129;—Ochsner, A. J., The surgery and pathology of the thyroid and parathyroid glands, 435;—O'Reilly, B. R., A manual of clinical diagnosis, 311;—Osborne, T. B., The vegetable proteins, 132;—Park, W. H. and Williams, A. W., Pathogenic micro-organisms, including bacteria and protozoa, 26;—Peckham, F. E., Fiske Fund Prize Dissertation, No. liii. The classification and treatment of diseases commonly known as rheumatism, 24;—Physicians visiting list, 129;—Piersol, G. A., Normal histology with special reference to the structures of the human body, 28;—Power, D'A. and Murphy, J. K., System of syphilis, ii, 98; v and vi, 26;—Practitioner's Visiting List, 1911, 24;—Pringle, J. H., Fractures and their treatment, 382;—Progressive medicine, 1910, iii, 29; iv, 129; 1911, i, 224; ii, 381;—Ramström, M., Emanuel Swedenborg's investigations in natural science and the basis for his statements concerning the functions of the brain, 130;—Report of the International Commission on the control of bovine tuberculosis, 130;—Report from Pathological Department, Central Indiana Hospital for the Insane, 437;—Rogers, L., Cholera and its treatment, 226;—Rost, C. R. and Williams, T. S. B., The cultivation of the bacillus of leprosy and the treatment of cases by means of a vaccine prepared from the cultivations. Scientific Memoirs, New Series, No. 42, 438;—Sahli, H., A treatise on diagnostic methods of examination, 311;—Schäfer, E. A., The essentials of histology, 29;—Schmidt, R., Interne Klinik der Bösartigen Neubildungen der Bauchorgane, 436;—Sequeira, J. H., Diseases of the skin, 313;—Shenton, E. W. H., Disease in bone and its detection by the X-rays, 438;—Sherman, H. C., Chemistry of food and nutrition, 313;—Stedman, T. L., A practical medical dictionary, 413;—Stelwagon, Henry W., Treatise on diseases of the skin, 128;—Stevenson, W. D. H., Preliminary report on the killing of rats and rat fleas by hyprocyanic gas. Scientific memoirs. New Series, No. 38, 129;—Stewart, G. N., A manual of physiology with practical exercises, 29;—Still, G. F., Common disorders

and diseases of childhood, 438;—Stimson, Julia C., Nurses' handbook of drugs and solutions, 96;—Stitt, E. R., Practical bacteriology, 128;—Sutherland, W. D., The applicability to medico-legal practice in India of the bio-chemical tests for the origin of blood stains. Scientific Memoirs, No. 39, 312;—Sutherland, W. G., Dispensing made easy, 96;—Sutton, H. A., and Druker, C. K., Osteology and Lyndesmology, 28;—Tanzi, A text-book of mental diseases, 436;—Tracy, S. C., Studies in invalid occupation, 98;—Turner, W. A., and Stewart, T. G., A text-book of nervous diseases, 381;—Tweedy, E. H. and Wrench, G. T., Practical obstretrics, 32;—Ware, M. W., Plaster of Paris and how to use it, 312;—Wechselmann, W. and Ehrlich, P., The treatment of syphilis with salvarsan, 226;—Weeks, J. E., A treatise on diseases of the eye, 26;—Whitman, R., A treatise on orthopedic surgery, 28;—Willard, De F., The surgery of childhood, including orthopedic surgery, 25;—Woodhead, J. S., Practical pathology, 66;—Wootton, A. C., Chronicles of Pharmacy, 24;—Wyllie, J., Meningitis, sinus thrombosis and abscess of the brain, 437;—Year-Book of the Pilcher Hospital, 313;—Zahersky, J., Golden Rules of pediatrics, 382.

Obstetrics and embryology in ancient Hebrew literature, 143.

Ophthalmic practice, A protest against the indiscriminate use of the organic compounds of silver in, 407.

Owen, Sir Richard: his life and works, 133.

Pancreas, Necrosis of the, 39.

Parker, H. P. and Hazen, H. H., Erythema multiforme iris during the course of typhoid fever, 79.

Pathology, experimental, and pathological physiology, The teaching of, to large classes, 404.

Pearce, R. M., The teaching of experimental pathology and pathological physiology to large classes, 404.

Peritonitis, Primary general, with isolation of the B. lactis aerogenes in pure culture from the peritoneal exudate, 116.

Peri-tonsillar abscess, 60.

Pleura, Primary carcinoma of the, 289.

Pneumococcus peritonitis, 219.

Pneumonia, broncho, Hyperleucocytosis of high grade in, in a child, 296.

Pneumonia, Jaundice in, 408.

Poisoning by vapors of "C. P." benzol, Investigation into several cases of, 8.

Puerperal infection, Report of a case of, with isolation from the uterus of B. *influenzæ* and a new method of making blood agar for its cultivation, 293.

Quinine, Dangers of the intravenous injection of, 101.

Radium, Employment of, as an aid to surgery in the treatment of cancer, angioma and keloid, 127.

Redelings, L. H., King, J. H., Chaffee, B. S. and Anderson, D. B., Studies in glycosuria. I, Ether glycosuria, 388.

Richardson, E. H., A synopsis of studies on peritoneal adhesions with a contribution to the treatment of denuded bowel surfaces, 283.

Rohrer, C. W. G., Sir Richard Owen: his life and works, 133.

Rosenheim, S., The submucous resection of the nasal septum, 121.

Saliva, A peptid-splitting ferment in the, 150.

Sarcoma, mixed celled, of the ovary and adenocarcinoma, Combined, 367.

Sarcoma and tuberculosis. Report of a case, 17.

Scarlet red and its component amidoazotoluol, in stimulating the epitheliation of granulating surfaces, 210.

Serum treatment of hemorrhagic diseases, 272.

Sewall, H., Henry Newall Martin, 327.

Shallenberger, W. F., Abdominal lipectomy, 410.

Sharpe, N. W., Transverse fracture of the body of the ischium in 1893; terminal displacement in 1902; diagnosticated in 1909, 57.

Silver, A protest against the indiscriminate use of the organic compounds of, in ophthalmic practice, 407.

Simonds, J. P., Sarcoma and tuberculosis. Report of a case

Smallpox, Zabdiel Boylston, inoculator, and the epidemic
Boston in 1721, 315.

Splenomegaly, Two cases of congenital hæmolytic jaundice
85.

Spondylolisthesis, 41.

Sprunt, T. P., Primary carcinoma of the pleura, 289.

Starnook, The: a new device for the rest-cure in the open air
for outdoor sleeping, 301.

Stone, H. B., Pneumococcus peritonitis, 219.

Suprapubic cytostomy, A device to aid in keeping the patient
after a, 160.

Summaries or titles of papers by members of the Hospital
appearing elsewhere than in the Bulletin, 61.

Teaching of experimental pathology and pathological physi
to large classes, 404.

Thalheimer, W., Report of a case of puerperal infection with
tion from the uterus of B. *influenzæ* and a new method for
ing blood agar for its cultivation, 293.

Thayer, W. S., Clinical notes. (1) Intermittent fever in
simulating malarial fever. (2) Grave malarial fever with
parasites in the peripheral circulation. Dangers of the
venous injection of quinine, 101.

Thayer, W. S., On disseminating caseating tuberculosis of the
146.

Thayer, W. S., The stereoscopic X-ray examination of the
with especial reference to the diagnosis of pulmonary
sis. (Discussion.)

Thayer, W. S. and Morris, R. S., Two cases of congenital
tic jaundice with splenomegaly. Observations on
jaundice, 85.

Theobald, S., A protest against the indiscriminate use of
organic compounds of silver in ophthalmic

Thyroid gland of fish, The relationship between
pathological, 152.

Thyroid histology, On certain limitations in

Transplantation of free flaps of fascia, 373.

Tubercle bacillus, The use of antiformin in the examina
sputum for the, 269.

Tuberculo-protein hypersensitiveness, Experimental studies
and their possible applications, 250.

Tuberculosis, The blood picture in, 428.

Tuberculosis of the liver, Disseminated caseating, 146.

Tuberculosis, pulmonary, The calcification of the costal cart
the cardio-thoracic index and other signs of, 247.

Tuberculosis, pulmonary, The stereoscopic X-ray examinat
the chest with especial reference to the diagnosis of,

Tuberculosis and sarcoma. Report of a case, 17.

Tuberculous endaortitis, Acute, 82.

Typhoid fever, Erythema multiforme iris during the course

Typhoid fever, The problem of, in Baltimore, 351.

Typhoid spine; with the report of two additional cases
bony changes in the vertebræ, 75.

Urinary tract, An anomalous duct belonging to the, 221.

Urinary tract, Infection of the, by the *Bacillus lactis*
with a consideration of the mode of entrance of bacteria
the bladder, 361.

Velasquez, The medical paintings of, 383.

Walker, G., A device to aid in keeping the patient dry
suprapubic cystostomy, 160.

Warfield, L. M., A peptid-splitting ferment in the saliva

Warfield, M., Peri-tonsillar abscess, 60.

Water, Baltimore City, Some observations on the bacter
the, 53.

Watson, E. M. and Ford, W. W., The problem of typhoid
Baltimore, 351.

, M. C., The clinical value of the determination of the
tic activity of the blood, 109.
itz, M. C., The effect of occlusion of the various hepatic
; upon the liver, 396.
S., Dunham, H. K. and Boardman, W. W., The stereo-
X-ray examination of the chest with especial reference
diagnosis of pulmonary tuberculosis, 229.
P. G., Acute tuberculous endoartitis, 82.
P. G. and Brown, H. A., An anomalous duct belonging
urinary tract, 21.
amination of the chest, Stereoscopic, with especial refer-
o the diagnosis of pulmonary tuberculosis, 229.

ILLUSTRATIONS.

na of the right Fallopian tube (Plate I, Figs. 1-2), 20.
Horn, 22.
olisthesis (Plate II, Figs. 1-7), 44.
malformations (Plates III-IV, Figs. 1-8), 44.
al deformities (Plate V, Figs. 1-5), 56.
rse fracture of body of right ischium, 58.
plate, 58.
s of the liver (Plates VI-XI. 1-24), 74.
berculous endaortitis (Plate XII, Figs. 1-3), 82.
skin graft (Plate XIII, Figs. 1-2), 84.
a and malarial fever (Charts I-IV), 102-103.
atelets and megalokaryocytes in Hodgkin's disease (Plate
Figs. 1-4), 114.
ous resection of the nasal septum (Figs. 1-2), 123.
ler and speculum, 124.
ard Owen (Plate XV), 138.
odge, Richmond Park, 139.
nated caseating tuberculosis of the liver with cavity
tion, 147.
on of the thyroid gland, 152.
through the thyroid gland of Sarda, 153.
through the thyroid gland of Brevoortia and Salvelinus,

lar bursitis (Plate XVI, Figs. 1-5), 158.
ation of posterior and anterior lobe, 169.
magnification, 170.
of tissue removed at operation; intact posterior lobe, 176.
ation of same, 176.
Intact posterior lobe and magnification of same, 179.
Perimeter charts (Figs. 1-2), 192.
Stereoscopic X-ray examination of the chest, 230.
Mechanism illustrating changes in the circulation in aortic insufficiency, 199.
Curves illustrating changes in the circulation in aortic insufficiency (Curves I-IX), 205-209.
Epitheliation of granulating surfaces (Figs. 1-3), 213-215.
Anomalous duct belonging to the genito-urinary tract (Plate XVII, Figs. 1-7), 222.
Diagram of gall bladder, together with cystic, hepatic and common ducts, 223.
Extensive denuded area on surface of ileum, 287.
Flap of peritoneum attached to raw bowel surface, 287.
Cross section of bowel and mesentery, 288.
Plication modification, 288.
Primary carcinoma of the pleura (Plates XVIII-XX, Figs. 1-12), 292.
Exterior and interior views of Starnook (Figs. 1-6), 301-303.
Title page, The Haven of Health, 304.
Adenocarcinoma and mixed-cell sarcoma of the ovary (Plates XXI-XXII, Figs. 1-7), 368.
Fascia to replace tendo Achillis, 374.
Fascia replacing defect in sartorius muscle, 374.
Fascia around vessels and on trachea, 375.
Fascia filling defect made by removal of patella, 375.
Fascia into joint after removal of cartilage, 376.
Fascia into skull and dura defect, 376.
Fascia over defect in trachea, 377.
Fascia in peritoneal defect, 379.
Fascia on lobe of liver, 380.
Transplantation of fascia (Plate XXIII, Figs. 5, 9 and 12), 380.
The medical paintings of Velasquez (Plates XXIV-XXVI, Figs. 1-12), 384-386.
Emboli of portal vein (Plate XXVII), 402.
Area of congestion following embolus of portal vein, 403.
Healed incision after abdominal lipectomy, 410.
Abdominal supporter worn after operation, 410.
Slab of skin and fat, 410.
R[obert] Koch, 427.
Neutrophiles (Plate XXVIII, Figs. 1-30), 433.

JUST ISSUED

THE JOHNS HOPKINS HOSPITAL REPORTS

Volume XVI (1911). 670 Pages and 151 Illustrations

tudies in the Experimental Production of Tuberculosis in the Genito-Urinary Organs. By GEORGE WALKER, M. D.

he Effect on Breeding of the Removal of the Prostate Gland or of the Vesiculæ Seminales, or of Both; together with Observations on the Condition of the Testes After Such Operations on White Rats. By GEORGE WALKER, M. D.

III. Scalping Accidents. By JOHN STAIGE DAVIS, M. D.

IV. Obstruction of the Inferior Vena Cava with a Report of Eighteen Cases. By J. HALL PLEASANTS, M. D.

V. Physiological and Pharmacological Studies on Cardiac Tonicity in Mammals. By PERCIVAL DOUGLAS CAMERON, M. D.

PRICE IN CLOTH, $5.50. PAPER, $5.00

Orders and remittances should be addressed to THE JOHNS HOPKINS PRESS, Baltimore, Md.

THE JOHNS HOPKINS HOSPITAL REPORTS.

VOLUME I. 423 pages, 99 plates.

VOLUME II. 570 pages, with 28 plates and figures.

VOLUME III. 766 pages, with 69 plates and figures.

VOLUME IV. 504 pages, 33 charts and illustrations.

VOLUME V. 480 pages, with 32 charts and illustrations.

The Malarial Fevers of Baltimore. By W. S. THAYER, M. D., and J. HEWETSON, M. D.

A Study of some Fatal Cases of Malaria. By LEWELLYS F. BARKER, M. B.

Studies in Typhoid Fever.

By WILLIAM OSLER, M. D., with additional papers by G. BLUMER, M. D., SIMON FLEXNER, M. D., WALTER REED, M. D., and H. C. PARSONS, M. D.

VOLUME VI. 414 pages, with 79 plates and figures.

VOLUME VII. 537 pages with illustrations.

VOLUME VIII. 552 pages with illustrations.

VOLUME IX. 1060 pages, 66 plates and 210 other illustrations.

Contributions to the Science of Medicine.

Dedicated by his Pupils to WILLIAM HENRY WELCH, on the twenty-fifth anniversary of his Doctorate. This volume contains 38 separate papers.

VOLUME X. 516 pages, 12 plates and 25 charts,

Structure of the Malarial Parasites. Plate I. By JESSE W. LAZEAR, M. D.

The Bacteriology of Cystitis, Pyelitis, and Pyelonephritis in Women, with a Consideration of the Accessory Etiological Factors in these Conditions, and of the Various Chemical and Microscopical Questions involved. By THOMAS R. BROWN, M. D.

Cases of Infection with Strongyloides Intestinalis. (First Reported Occurrence in North America.) Plates II and III. By RICHARD P. STRONG, M. D.

On the Pathological Changes in Hodgkin's Disease, with Especial Reference to its Relation to Tuberculosis. Plates IV-VII. By DOROTHY M. REED, M. D.

Diabetes Insipidus, with a Report of Five Cases. By THOMAS B. FUTCHER, M. B. (Tor.).

Observations on the Origin and Occurrence of Cells with Eosinophile Granulations in Normal and Pathological Tissues. Plate VIII. By W. T. HOWARD, M. D., and R. G. PERKINS, M. D.

Placental Transmissions, with Report of a Case during Typhoid Fever. By FRANK W. LYNCH, M. D.

Metabolism in Albuminuria. By CHAS. P. EMERSON, A. B., M. D.

Regenerative Changes in the Liver after Acute Yellow Atrophy. Plates IX-XII. By W. G. MACCALLUM, M. D.

Surgical Features of Typhoid Fever. By THOS. MCCRAE, M. B., M. R. C. P. (Lond.), and JAMES F. MITCHELL, M. D.

The Symptoms, Diagnosis, and Surgical Treatment of Ureteral Calculus. By BENJAMIN R. SCHENCK, M. D.

VOLUME XI. 555 pages, with 38 charts and illustrations.

Pneumothorax: A historical, clinical, and experimental study. By CHARLES P. EMERSON, M. D.

Clinical Observations on Blood Pressure. By HENRY W. COOK, M. D., and JOHN B. BRIGGS, M. D.

The value of Tuberculin in Surgical Diagnosis. By MARTIN B. TINKER, M. D.

VOLUME XII. 548 pages, 12 plates and other illustrations.

The Connective Tissue of the Salivary Glands and Pancreas with its Development in the Glandula Submaxillaris. Plates I-III. By JOSEPH MARSHALL FLINT, M. D.

A New Instrument for Determining the Minimum and Maximum Blood-Pressures in Man. Plates IV-X. By JOSEPH ERLANGER, M. D.

Metabolism in Pregnancy, Labor, and the Puerperium. By J. MORRIS SLEMONS, M. D.

An Experimental Study of Blood-Pressure and of Pulse-Pressure in Man. Plates XI and XII. By JOSEPH ERLANGER, M. D., and DONALD R. HOOKER, A. B., M. S.

Typhoid Meningitis. By RUFUS I. COLE, M. D.

The Pathological Anatomy of Meningitis due to Bacillus Typhos WILLIAM G. MACCALLUM, M. D.

A Comparative Study of White and Negro Pelves, with a Com of the Size of the Child and Its Relation to Present Character of Labor in the Two Races. By THEODORE F.

Renal Tuberculosis. By GEORGE WALKER, M. D.

VOLUME XIII. 605 pages, with 6 plates, 201 figures 1 colored chart.

Studies in Genito-Urinary Surgery.

The Seven-Glass Test. By HUGH H. YOUNG, M. D.

The Possibility of Avoiding Confusion by Bacillus smegmatis bacillus) in the Diagnosis of Urinary and Genital Tubercul Experimental Study. By HUGH H. YOUNG, M. D., and CHURCHMAN, M. D.

Urethral Diverticula in the Male. By STEPHEN H. WATTS, M. D.

An Unusual Case of Urethrorrhagia. By H. A. FOWLER, M. D.

Paraurethritis. By JOHN W. CHURCHMAN, M. D.

Use of Ointments in the Urethra in the Treatment of Chronic HUGH H. YOUNG, M. D.

Treatment of Stricture of the Urethra. By HUGH H. YOUNG, JOHN T. GERAGHTY, M. D.

The Treatment of Impermeable Stricture of the Urethra. By YOUNG, M. D.

The Treatment of Bacteriuria by Internal Medication. By CHURCHMAN, M. D.

Use of the Cystoscope in the Diagnosis of Diseases of the Prost HUGH H. YOUNG, M. D.

Chronic Prostatitis. An Analysis of 358 Cases. By HUGH H. M. D., JOHN T. GERAGHTY, M. D., and A. R. STEVENS, M. D.

Modern Method for the Performance of Perineal Lithotomy. By YOUNG, M. D.

Operative Treatment of Vesical Diverticula. By HUGH H. YOUNG

Case of Double Renal Pelvis and Bifid Ureter. By HUGH H. YOUNG

Pyonephrosis Due to Bacillus Typhosus. By HUGH H. YOUNG, LOUIS C. LEHR, M. D.

The Use of the X-ray in the Diagnosis of Renal and Ureteral Calc F. H. BAETJER, M. D.

Nephritis and Hæmaturia. By H. A. FOWLER, M. D.

The Microscopic Structure of Urinary Calculi of Oxalate of Lime H. A. FOWLER, M. D.

Cystinuria with Formation of Calculi. By H. A. FOWLER, M. D.

Post-Traumatic Atrophy of the Testicle. By JOHN W. CHURCHMAN

A Description of the Dispensary for Treatment of Genito-Urinary Cases at the Johns Hopkins Hospital. By HUGH H. YOUNG

VOLUME XIV. 632 pages, with 97 figures.

Studies in Genito-Urinary Surgery.

The Treatment of Prostatic Hypertrophy by Conservative Perineal tatectomy. An analysis of cases and results based on a report of 145 cases. By HUGH H. YOUNG, M. D.

Recto-Urethral Fistulæ. Description of New Procedures for the vention and Cure. By HUGH H. YOUNG, M. D.

The Early Diagnosis and Radical Cure of Carcinoma of the Prostate a study of 40 cases and presentation of a radical operation was carried out in four cases. By HUGH H. YOUNG, M. D.

VOLUME XV. 542 pages, with 87 illustrations.

Twelve papers on pneumonia. By DRS. CHATARD, FABYAN, MARSHALL, MCCRAE, STEINER, HOWARD and HAINES.

A Study of Diarrhœa in Children. By J. H. MASON KNOX, JR. EDWIN H. SCHORER, M. D.

Skin Transplantation. By JOHN STAIGE DAVIS, M. D.

Epidemic Cerebrospinal Meningitis and Serum Therapy at the Johns Hospital. By FRANK J. SLADEN, M. D.

VOLUME XVI. 670 pages with 151 figures. (Now in

Studies in the Experimental Production of Tuberculosis in the Urinary Organs. By GEORGE WALKER, M. D.

The Effect on Breeding of the Removal of the Prostate Gland Vesiculæ Seminales, or of Both; together with Observations Condition of the Testes after such Operations on White GEORGE WALKER, M. D.

Scalping Accidents. By JOHN STAIGE DAVIS, M. D.

Obstruction of the Inferior Vena Cava with a Report of Eight By J. HALL PLEASANTS, M. D.

Physiological and Pharmacological Studies on Cardiac Tonicity mals. By PERCIVAL DOUGLAS CAMERON, M. D.

The set of sixteen volumes will be sold, bound in cloth, for dollars, net. Volume II will not be sold separately. Volumes IV, V, VI, VII, VIII, X, XI, XII, XIII, XIV, XV, XVI will be $5.00, net, bound in paper, and $5.50, net, bound in cloth. Volume will be sold for ten dollars, net.

Orders should be addressed to The Johns Hopkins Press, Baltim

---

The Johns Hopkins Hospital Bulletins are issued monthly. They are printed by the LORD BALTIMORE PRESS, Baltimore. Subscriptions a year (foreign postage, 50 cents), may be addressed to the publishers, THE JOHNS HOPKINS PRESS, BALTIMORE; single copies will be mail for twenty-five cents each. Single copies may also be procured from the BALTIMORE NEWS CO., Baltimore.

AUG 0 5 1977

UNIVERSITY OF MINNESOTA
biom,per v.22
stack no.74
Johns Hopkins Hospital.
Johns Hopkins hospital bulletin.
3 1951 002 681 860 O

JOHNS
HOPKINS

olume
ear
agree to co
the above
gnature
dress
JOHNS
HOPKINS

olume
ear
agree to co
the above
gnature
dress

1915

REGENTS OF THE UNIVERSITY OF MINNESOTA

BIO-MEDICAL LIBRARY